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This Week in The IRON AGE

Vol. 155, No. 4 January 25, 1945

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The IRON AGE

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Time Saving

DAYLIGHT saving, like most everything else, is not a modern innovation. According to the Bible it was invented by Joshua, who, we are told, made the sun stand still so that he could finish the job of demolishing his enemies.

It was a great asset that Joshua possessed in being able to so manage the clock that he could have the necessary time to finish his work. Many of us today would like to have the ability to declare a similar moratorium on time.

It is true that Mr. Roosevelt has given us the benefit of daylight saving which is bemoaned by our schoolboys who have to trudge to their daily recitation of the three "R's" during Nature's morning blackout and by our farmers who cannot get their cattle imbued with the war spirit.

It has, as an aside, also been a moot question among those who operate or work on night shifts in these days when factories are operated on 20 to 24 hour shifts, as to who gets what from clock juggling. Everybody gets up in the dark and goes home in the dark regardless of the shift on which he works.

I am not registering a complaint with respect to time saving. I am for that 100 per cent and so are the great majority of doers in this country who have been brought up to try to pack more and more into each minute as time goes on. And especially now, when we are at war, do I think that time saving is of the very essence.

The point that I wish to make, if I can, is that you do not save time, nor do you lose it by moving the hands of a clock back or forward. The only way that you save time is to make it possible for people to accomplish more in a given time interval.

What I am thinking about is the enormous waste of time that has been wished upon busy executives in this country through the regulations which compel them to spend almost endless hours in filling out reports, forms and applications that have little or nothing to do with helping to win the war but much to do with detracting from the efficiency of the war effort. Detracting from it because this work, and believe me it is work, takes their minds completely away from the primary task of war production.

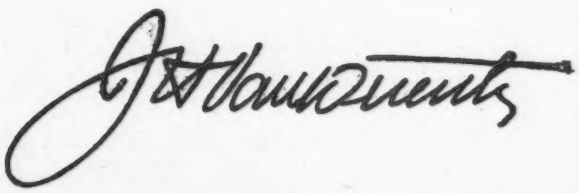
I will pass over such matters as preparing income tax reports, social security statistics, renegotiation theses and priority applications and get down to the case of Mary Jones.

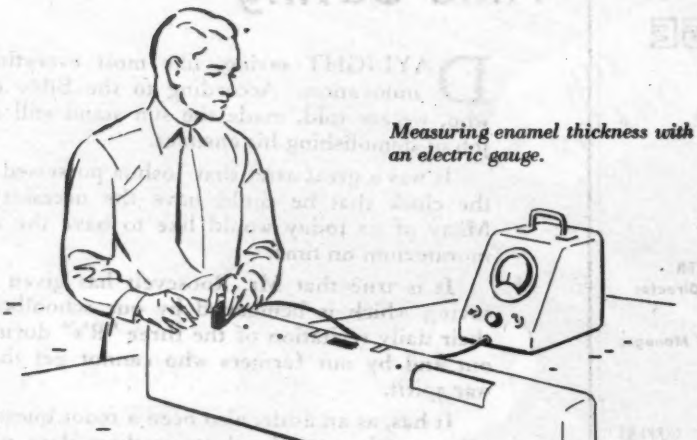
Mary Jones is a clerical worker whom we thought was deserving of a raise. She had been on the job several years, had stuck to it well and faithfully and had like most other office workers been under increasing pressure during that period.

The idea was to get Mary a raise of $3.00 per week. Under ordinary circumstances the management could have done that in one minute with a stroke of the pen. But times are different.

The work of preparing a request for this raise to be submitted to the War Labor Board took a total time of 14 hours of two very busy executives who otherwise might have been doing something to help win the war. Maybe she will get it and maybe she won't. In the latter case she will probably quit and go some place where she can get what she is worth or thereabouts in which case we will lose not only Mary but the 14 executive hours of work as well.

There's an old saying: "Penny wise and pound foolish." But who pays any attention to old sayings?





Measuring enamel thickness with an electric gauge.

TI-NAMEL

Another New Creation by Inland Steel Company's Research Laboratories

The long awaited porcelain enameling base, which eliminates the necessity for a ground coat, is here! It is Ti-Namel, the new titanium alloy steel—the newest creation by Inland's research laboratories.

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Ti-Namel reduces reoperations, edging, and scrap. It is fired at lower temperatures, and in less time. In short, Inland Ti-Namel Steel increases shop output, lowers manufacturing cost, and assures superior vitreous enameled ware.

Pending patent applications on the new enameling process and product made thereby, are owned jointly by Inland Steel Company and The Titanium Alloy Manufacturing Company under trust agreement.

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INLAND STEEL

The IRON AGE
January 23, 1945

NEWS FRONT

The German "Foo Fighters" were said last week by Army Transport pilots to be atic electricity, or St. Elmo's fire.

About 65 per cent of German steel production lies in the Ruhr Valley and approximately 10 per cent in the Saar. Saarbrucken, captured last month by the Allies, has two blast furnaces and extensive coking plants.

But: Allied armies must knife into Germany for 50 to 75 more miles before steel production will be cut below essential military consumption.

No traces of boron have yet been found in the alloy steel of captured German equipment, even with the most accurate of spectroscopic examinations.

The original Iridite colored coating for steel, controlled by Rheem Mfg. Co., has been supplemented by other colors, obtained by dyeing the basic olive drab coating.

Iridite Black is being widely employed, as is Red, Blue, Green, and Flavine colors. A very recent addition is Iridite Bronze, a one-dip basic coating that is a truly rich bronze hue having excellent corrosion-resistant characteristics.

The Japanese have announced the loss of 82 Admirals in combat. This figure can be compared with a total of 312 Admirals in the much larger American Navy.

The rising costs of British production is exemplified by the announcement that a diesel motorship of 9200 tons would have cost $340,000 in 1936, while today a similar vessel would cost $900,000.

The cigarette ration in Germany is two per day, and cigarettes will buy anything in the black market. Cigarettes are even very scarce in the Wehrmacht.

German working hours are now generally fixed at 60 hr. per week. Eight different wage groups have been established, with a basic wage for each group, and additional bonuses geared to individual output.

The Michigan Manufacturers Association and the UAW-CIO are lined up against the War Manpower Commission in the debate concerning Detroit's ability to take on new war jobs.

The auto union claims that employment at Willow Run has dropped from 40,000 to 0,000 in recent months, that Briggs has laid off about 12,000 and Murray more than 6000 to support its position that a labor shortage does not exist in Detroit.

In spite of WMC's insistence that labor shortages do exist in Detroit, war contracts for tanks and other ordnance vehicles and preliminary work on significant aircraft developments are being placed.

The omission of scrap yards from the latest list of essential work may make a bad situation more serious. Scrap yards have been suffering from a dearth of labor for some time and a further exodus of workers seeking draft deferments will likely result in a critical supply situation.

And: It has even been predicted that open hearths may be forced to shut down because of lack of scrap if this situation is left unchecked.

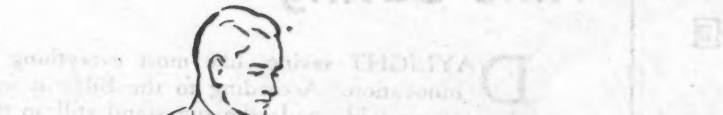
The current long-term ownership of passenger automobiles has uncovered deficiencies in corrosion protection, which are the subject of considerable investigation among car builders.

And: The breakdown of chromium-plated parts has led to the promise that auto makers will provide future owners with plating of better quality and increased durability.

An $8,000,000 zinc refinery is in prospect for the Pacific Northwest on completion of a survey by American Smelting & Refining Co. The plant will likely be located in Tacoma and will employ about 1000 people.

The automobile industry turned out more than a million dollars worth of armament an hour during 1944. That amounted to $9,320,000,000 for the year, 8 per cent more than was made in 1943.

Aircraft and aircraft parts accounted for $4,200,000,000; motor vehicles and parts, $2,500,000,000, and tanks and tank parts, $1,050,000,000.



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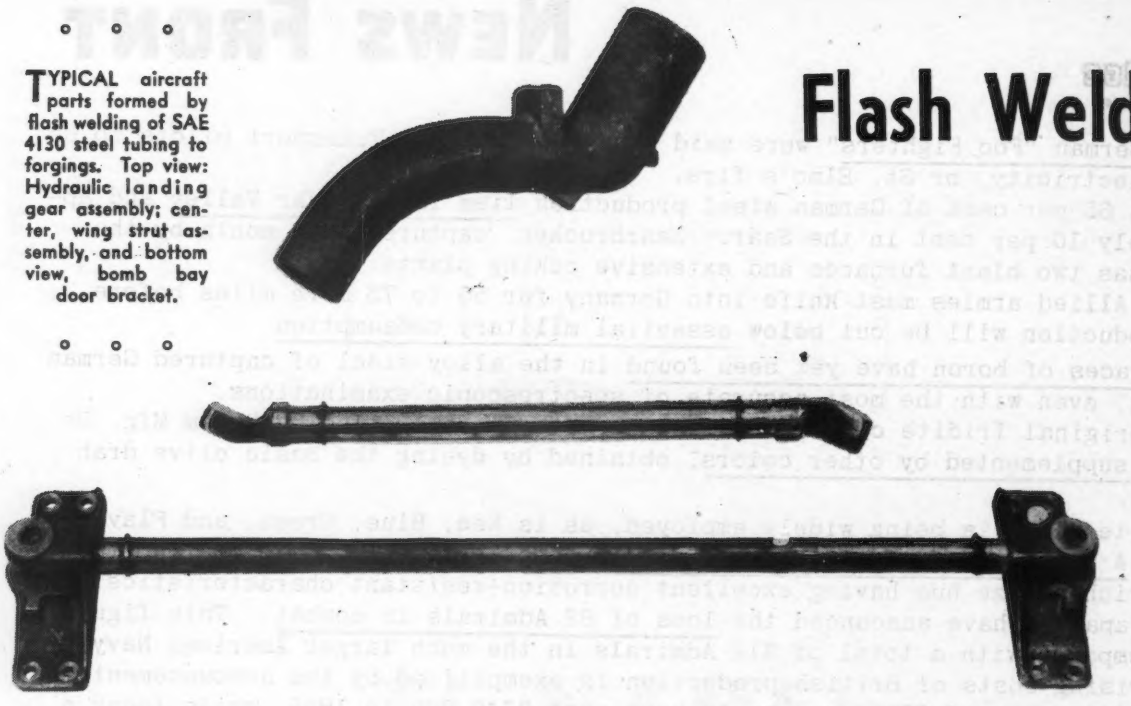
Flash Welding SA



TYPICAL aircraft parts formed by flash welding of SAE 4130 steel tubing to forgings. Top view: Hydraulic landing gear assembly; center, wing strut assembly, and bottom view, bomb bay door bracket.

WHILE SAE 4130 steel has good weldability characteristics, it is only in recent years that the aircraft industry has extended flash welding to this material. The advantages of the flash welded joint over the fusion welded joint are as follows:

(1) Better physical characteristics (100 per cent joint strength).
(2) Lower weight.
(3) Cheaper and faster production with less operator skill required.
(4) No warping as a result of welding.
(5) Less brittleness at low temperatures such as are encountered at high altitudes.
(6) Higher fatigue strength.

Welded assemblies made from SAE 4130 steel may be used without subsequent heat treatment. However, all types of welding have effects on the microstructure of this steel which make heat treatment advisable wherever it is practical. One reason is to release locked-in stresses which are caused by the contraction of the metal upon cooling. Another is that just adjacent to the weld zone, a portion of the metal has been treated to just slightly below the critical temperature, thus causing an annealing effect. This may result in a 10 per cent drop in tensile strength. The third or most important effect is, however, that since chrome-moly is an air hardening steel, the fast cooling of the weld results in a brittle zone next to the weld. This is particularly true in flash welding where the chilling effect of the dies is tremendous. With proper die spacing and correct machine setting, all of these effects can be minimized to the point where subsequent heat treatment can be dispensed with. Lockhead Aircraft Co. reports that excellent physical test results have been obtained with welded joints in which the component parts have been heat treated up to 140,000 lb. per sq. in. before welding, with no heat treatment after welding. Of course, if there is to be no further heat treatment after welding, the steel must be in the normalized state before welding.

Up to the present time, the majority of applications of flash welded joints are on tubular sections. Typical parts include an end fitting welded to a tube joint in which the fitting may be either forged or turned down from solid stock, or one tube to another. The range of areas welded may vary from less than 0.04 sq. in. up to over 6 sq. in.

Design Considerations

One of the greatest hindrances to flash welding is the failure of the various industries to design their parts for flash welding. The net result of this is that critical welds are obtained both from the standpoint of complete fusion and of weld brittleness along with bad alinement. The proper design of a part to be flash welded is one in which there is sufficient clamping surface and length for die spacing with a positive machined backup. The main objection of the aircraft industry to the changing of the design is that since the tubular section of the forging must be lengthened this necessitates additional machining and a change of forging dies.

If the final use of parts is to be in the normalized state or at comparatively low strength heat treatment, all component parts may be finish machined before welding and the final assembly may be held within customary tolerances of plus or minus 0.010 in. This is of course, with an excellent flash welding design on the part. While this close tolerance can be held, it should be evident that it requires more time for setup in the shop and requires more skill on the part of the operator. Consequently the design should not call for a tolerance which does not have to be held, such as on any part which has threaded fittings at one or both ends.

Welding Setup

It is logical to assume that the amount of burnoff and upset are functions of the wall thickness of the tubing and should be figured on that rather than on diameter or area. The following table gives the approximate burnoff and upset for various tubing wall thicknesses.

Wall Thickness, In.	Total Flash, In.	Total Upset, In.
0.035	0.190	0.050
0.049	0.290	0.075
0.065	0.345	0.100
0.083	0.395	0.115
0.125	0.430	0.135
0.150	0.485	0.140
0.250	0.532	0.133

*Since this article was written, Mr. Ackerman died in the service of his country.

SAE 4130 Steel Tubing . . .

By WALTER PESTRAK,
Senior Welding Engineer
and W. W. ACKERMAN*
Welding Engineer
Federal Machine & Welder Co.
Warren, Ohio

. . . SAE 4130, with its sister steel NE 8630, has distinguishing characteristics which make it particularly desirable as an aircraft steel, such as excellent strength-weight ratio, good weldability and high tensile strength with good impact resistance. Practical considerations relating to the flash welding of this material are presented.

These values are the best available at the present time and should be satisfactory for almost all applications.

In motor driven flash welders, the amount of upset is easily set by shimming the upset block on the cam. However, there is some question whether with hydraulic machines the cylinder should be bottomed at the end of upset or whether the resistance of the metal to further upset should be the determining factor. The chief argument for bottoming the cylinder is that it gives a definite take up. It would seem logical, however, to believe that the best and most consistent welds can be obtained if exactly the same forging pressure is applied to the weld every time.

Theoretically both methods should give not only consistent welds, but also definite takeup. This is going on the assumption that the composition of the steel does not vary, that the steel is clean and that the dimensions do not vary from piece to piece and also that there is no slippage in the dies or variation in welding voltage. The uniformity of operation of the welder is also of great importance. If any of these conditions are absent, bottoming the cylinder is likely to result in faulty welds when welding a critical steel like chrome-moly. Not bottoming the cylinder will tend to offset these to a certain extent but with a variation in upset distance. One of two compromises must be made if all conditions are not to be held constant; either the quality of the weld must be sacrificed or the amount of takeup must suffer some variation.

Upset Pressure

If the cylinder is going to be bottomed, the upset pressure is of no influence on the weld so long as it is sufficient to insure bottoming the cylinder. On the other hand, if the cylinder is not going to be bottomed, the upset pressure is of major importance. Although upset pressure is commonly considered as a function of the cross-sectional area, it is also really a function of the compactness of the weld area. For example, take the two extreme cases, the one of a solid round section and the other of a tubular section of very large diameter with exceedingly small wall thickness. Even though both of these have equal cross-sectional area, it would be foolish to use the same upset pressure and expect similar welds.

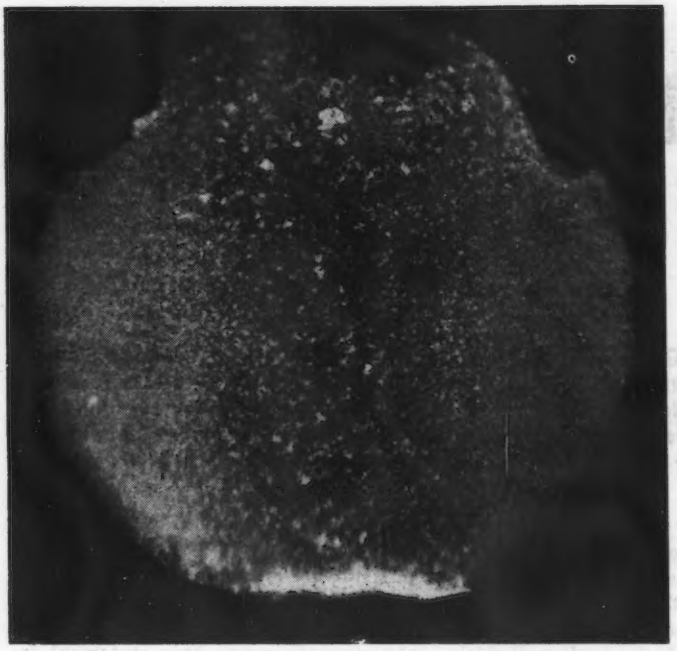
To determine the unit upset pressure of the weld area, two things must be taken into account: First, the type of steel being welded and second, the difficulty of extruding the molten metal from the weld. Unfortunately, very little is known about just what is the desirable pressure for various types of sections. This much can be stated. If excessive pressure is used, the effect upon the weld is to cause excessive brittleness and low impact strength along with probably incomplete fusion but with quite high tensile strength.

There are two ways in which brittleness may be caused in the welding of SAE 4130 and other alloy steels. The first cause is the quenching effect due to the fast cooling of weld by the chilling action of the dies. Since most of these steels are air hardening, the result is brittleness in the weld zone. The second cause of brittleness is less obvious and is open to some argument. A ductile material is one that will elongate before rupture. This elongation is obtained because of the ability of the grains in the steel to slip along each other. These grains can only slip so far until rupture is the result. If after upset in a flash weld there is excessive pressure during the cooling below the plastic temperature of the metal, the net result is that the grains have slipped as much as they are able and therefore, due to this cold working the weld is more brittle than it might have been.

According to the manual of the Resistance Welder Manufacturers Association, welds made with insufficient pressure are characterized by porosity, inclusions, low strength and poor impact resistance. In the welding of chrome-moly steels, this statement is open to debate on almost all points. In welding 0.125 in. wall tubing, for example, the upset pressure was dropped to 7000 lb. per sq. in., yet when photomacrographs were taken, there were no indications of porosity or inclusions. Probably in mild steel which may contain many impurities, there would be slag inclusions with too low an upset pressure. Concerning tensile strength, in all cases the low pressure welds broke outside of the weld when the weld was tested in the unheat-treated state. The outstanding characteristic of the low pressure weld was its extreme ducility as compared to that of a high pressure weld. In every low pressure weld there appears a white line directly through the weld.

According to metallurgists this line may be caused by a variety of things and there are various opinions about whether or not it is harmful. From work carried on up to date, the belief is that this line is not harmful if the weld is to be used in the unheat-treated state, since the strength of this white line is more than that of the parent material. It is questionable whether with an exceedingly high strength heat treatment this line will heat treat to the desired properties.

In summing up the effect of pressure, the following recommendations are made. If the weld is to be used without further heat treatment or annealing, a minimum of upset pressure should be used, thus resulting in a ductile weld. However, if annealing or further heat treatment are in order, the upset pressure should be increased to about three times the minimum value since the resulting



LEFT PHOTOMACROGRAPH of a flash weld in SAE (X4130 steel).

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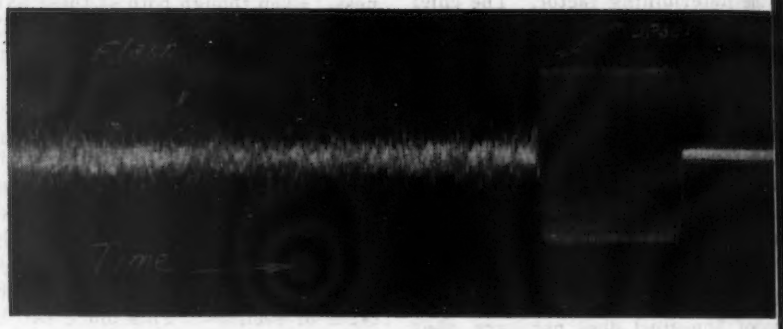
BELOW OSCILLOGRAM of flash weld in SAE (X4130 steel).



brittleness will disappear with heat treatment and with increased pressure the white line is not so predominant.

As in any flash welding, the speed of upset is very important with SAE 4130 steel. There are reasons to believe that the faster the upset the better the weld and perhaps the less pressure required. One reason, of course, for desiring a fast upset is to prevent oxidation of the high temperature weld surfaces.

Die Opening

Since the chilling effect of the dies is quite large and has much influence upon brittleness of the weld, the die opening should be kept greater for SAE 4130 than for mild steel. Limiting factors which must be taken into account, however, are the design of the pieces being welded, the ability to hold alinement and on very light wall tubing, the deformation of the tubing under upset pressure. There is some question as to whether the die opening should be a function of the wall thickness or of the tubing diameter or of both. The following table takes into account only tubing diameter but the data should work well for all of the common wall thicknesses:

Outside Diam. of Tube, In.	Die Opening at Start, In.
0.375	1.00
0.500	1.25
0.750	1.50
1.000	1.75
1.250	2.00
1.500	2.00
2.125	2.00

Flashing Time

Like burnoff and upset, the flashing time is a function of wall thickness and is quite critical in the thinner wall tubing. It is critical more from the extent of keeping a consistent flashing time after a good weld setting has been found than in an initial setting since cam design, machine operation, preparation of work and amount of upset are all influencing factors. Therefore, the values given below can be varied depending upon other conditions.

Like flashing time, upset time is a function of the wall thickness and is of extreme importance in obtaining good welds. For thin walled tubing, it has been found necessary to cut off the current before upset in order to prevent burning off the tubing or overheating the weld. In the thicker tubing the current should be kept on until the upset is completed and perhaps some annealing action might be obtained if it is left on even longer. For heavy walled tubing, the danger lies more in cutting off too soon than in cutting off too late. Speed of upset is of great influence upon the required current carry-over.

These values should serve as a general guide:

Wall Thickness In.	Flashing Time, Sec.	Upset Time, Cycles
0.035	3.5	3
0.049	4.5	5
0.065	5.5	7
0.083	7.0	9
0.125	10.5	10.5
0.150	15.0	15
0.250	23.0	30 Approx.

PLAN view of a Federal flash welder for welding SAE 4130, showing die and backup construction.

A heavy duty flash welder for welding SAE 4130 chrome-moly and other alloy steels.

In welding SAE 4130 steel, the secondary voltage should be kept as low as possible. The customary procedure in making a setup of chrome-moly is to adjust the die opening, flash and upset distance, pressure, flashing and upset time to the desired values and then to increase the secondary voltage until no freezing is encountered. The effect of too great a secondary voltage and consequently too great a current is to cause large flash particles to be thrown out, thus not only leaving large irregularities on the weld surface to be closed up, but also resulting in incomplete fusion in the case of SAE 4130.

If at the start of the flashing very small particles are thrown out but near the end large pieces of metal are emitted, the fault lies not with the secondary voltage, since it is as low as it can be without causing freezing, but with the cam design. Sometimes by increasing the edges of the tubing or forging, the voltage can be dropped another tap. A cam which has worked very satisfactorily for chrome-moly is one which at the beginning of flashing has a rise of 0.0005 in. per deg. and at the end of flashing a rise of 0.0055 in. per deg. With such a cam, it is desirable to bevel the edge of one tube at an angle of 60 deg. with the centerline of the weld.

Inspection of Flash Welds

At the present time there is no conclusive method of non-destructively testing flash welds. While extensively tried, X-ray inspection has showed little promise or has given little indication of the strength of a flash weld. In use at the present time is magnetic particle inspection or Magnafluxing which has been slightly more successful in that it will reveal very bad flaws due to lack of fusion but it has not as yet been able to differentiate between good welds and those which, while containing no serious flaws, are considerably below the desired strength.

It is believed that the best available inspection method is the close control of the equipment and the process after the machine has been properly set up. One good method of testing is as follows: On the first lot of each new part, four test coupons are prepared for each different weld. These coupons are identical to the production parts with respect to material and heat treatment, diameter and gage. Three of the coupons are tested to destruction in tension while the fourth is subjected to microscopic examination. In addition a coupon is made and subjected to the test load after each 25 succeeding welds. A failure of any coupon below the test load during a production run is cause for the testing of the proceeding lot of 25 welds to determine their acceptance or rejection. If the equipment is of the proper type and properly qualified, this method will result in obtaining 100 per cent satisfactory welds.

Brazing Low-Alloy Tool Tips with Powdered Alloys

FROM studies of the structure and properties of a number of alloy compositions for the hard-tipping of cutting tools and of the various methods of applying these materials, N. A. Minkevich, Yu. A. Geller and E. I. Belikova conclude that forged tips of low-alloy steel of the following composition, 0.9 to 1.0 C; 4.5 to 5.3 Cr; 3.5 to 4.0 Mo; 2.0 to 2.5 Va; 0.4 max. Si, and 0.4 max. Mn, when attached to the tool shank by mechanical means give the best results. These tips proved to be equivalent, and in some respect even superior, to tungsten high speed steels, the authors report in *Vestnik Metallopromyshlennosti*, No. 4 to 5, pp. 38-52.

Cutting tips having a chemical analysis of 4.0 C; 15.4 Cr; 6.0 Mo, 6.0 Va; 1.0 to 2.0 Si, and 0.75 Mn were produced by welding. Either soft iron electrodes with a ferroalloy coating or cast alloy electrodes with a chalk-water glass coating were used. The structure of the deposited material was that of a ledeburite eutectic with large primary carbides. Another alloy of the same type, but containing less carbon and more vanadium, gave a more uniform and finer structure.

It was found that welded tips were difficult to grind to shape as their hardness could not be appreciably reduced by annealing. Chill-cast tips of these alloys and of less highly alloyed compositions were produced for attachment to the tool shanks by brazing. These tips tended to have casting faults. Cutting tests on the welded and cast tips showed them to be inferior to tungsten steel.

Large Scale Working Of Adirondack Ma

. . . Mines abandoned 25 to 90 years ago have been reopened, active mines greatly expanded in activity and $40,000,000 worth of modern mining and concentrating equipment has been installed to produce a high grade magnetite sinter from ores ranging from lean to rich. Depletion of high grade Lake Superior ores, and the fact that major steel companies are working these Adirondack ores, lend them a new importance. In the first part of the article many of the economic factors are compared in order to evaluate the permanence of this activity and its influence on blast furnace practice.

By FRANK J. OLIVER

RESURGENCE of iron mining activity in the Adirondack area of New York State has posed a set of new economic and technical questions to blast furnace operators in particular and iron and steel consumers in general. The prime question relates to the comparative cost of beneficiated magnetites of high iron content shipped via rail with respect to lower grade Lake Superior hematites shipped by water. This question cannot be considered alone but must be related to that of how serious has been the depletion of the rich ores in Minnesota and the Upper Peninsula of Michigan and what will be the added costs of concentrating such ores. What these costs will ultimately be is anybody's guess, but considering present concentrating costs in the Adirondacks an added $1 a ton would be on the conservative side.

An increasingly large tonnage of Lake ores are already being screened in order to remove fines and thus produce a more uniform product as regards passage of gas through it in the blast furnace. Sintering the fines is the next step necessary to make them usable in the blast furnace. Whatver costs involved in these procedures today are absorbed within the present OPA ceiling prices of $4.45 to $4.75 per gross ton delivered to lower Lake ports (51.5 per cent Fe), of which $1.81 is the rail-water rate. For Pittsburgh delivery $1.21 should be added. But as the cream of the rich ores is skimmed off, the cost of beneficiation will naturally rise and will ultimately be passed on to the consumer. Obviously, the increase in the price of such a basic raw material will be reflected right up the line through pig iron and semi-finished and finished steel products.

Don B. Gillies, vice-president of Republic Steel Corp., has figured[1] that, taking into account an average rail rate of $2.66 from Port Henry, N. Y. (see Table I), the break-even point for cost of Adirondack sinter (68.5 per cent Fe) as compared with an average cost of Mesabi Lakes ore delivered to Mahoning Valley furnace at $5.45 per long ton would be $4.59 at the mines. In either case, the cost per long ton unit of iron would be 10.58c. delivered to the mill. The indications are that such costs are presently being met or will be as soon as the newly built concentrating plants reach 100 per cent capacity operations or close to it.

[1] *"Economics of the Current Revival in Adirondack Iron Ore Mining," Mining and Metallurgy, November, 1943.*

Blast Furnace Economies

There is another side of the picture which Mr. Gillies and others[2] point out, namely, that use of magnetite sinter in place of Lake Superior soft ores results in many blast furnace savings. At Republic mills, use of high percentages (40 to 45 per cent) of sinter in the blast furnace has raised production from 10 to 19 per cent, decreased coke consumption approximately 15 per cent, flux consumption 20 per cent and cut flue dust production by as much as 50 per cent. These savings are explained on the basis that a porous sinter cake containing 68½ per cent iron (1) reduces the slag forming elements in proportion to the degree of iron concentration with corresponding benefit upon the fuel rate for smelting, productive capacity and the problem of slag disposal and (2) the use of a heavier burden and higher blast temperatures (but with much less gas volume) results in more efficient fuel utilization. In soft ore practice, the greater volume of gas is created by the hard blowing rate and by the release of the volatile elements contained in the soft ores. In the sintering process all volatile elements including moisture pass off because the ore actually reaches the fusion point even though only momentarily. The net result is less byproduct gas for fuel used around the steel mill, but as far as the merchant stack is concerned, blast furnace gas is an embarrassment of plenty since the stoves consume only a fraction of the gases generated in soft ore practice. For the latter, the saving in furnace fuel cost when using sinter will be net, while

[2] *"Sinter and Blast Furnace Thermal Principles," by Charles E. Agnew, Steel, Oct. 4, 1943; also "Beneficiated Iron-Bearing Materials," by Agnew, Steel, Sept. 4 and 11, 1944.*

TABLE I

Typical Rail Freight Rates for Magnetite Sinter From Adirondack Mines

Destination	Rate per Gr. Ton	Tariff Miles (Range)
Aliquippa	$2.58	494
Ashland, Ky.	3.34	795
Bethlehem, Pa.	2.17	340
Buffalo	2.00	374
Cleveland	2.855	555-564
Massilon	2.855	582-810
Middletown	3.54	740
Neville Island	2.58	...
Pittsburgh	2.58	590
Portsmouth, Ky.	3.34	770
Sparrows Pt.	2.38	448-542
Swedeland, Pa.	2.175	...
Wheeling, W. Va.	2.855	...
Youngstown	2.58	526-545

Magnetites

for the steel plant the saving will be the difference between the savings in coke cost and the extra expenditure for auxiliary power fuel, normally supplied by blast furnace gases. In this connection, it should be noted that the higher blast temperatures suitable for reducing sinter require larger stoves for blast heating and consequently a higher percentage of gas for this purpose.

For years some of the Eastern mills have been operating on magnetite sinter, notably the furnaces of the Alan Wood Steel Corp. at Swedeland, Pa. This company largely depended upon the Scrub Oak magnetite mine at Dover, N. J., out of which over a million tons of crude ore have been taken annually since the start of the war. To this supply has been added Adirondack sinter and during the past summer, Alan Wood began operating the mines of the Ringwood Co. (in northern New Jersey) which had been dewatered and reopened with DPC funds after being abandoned since the last war.

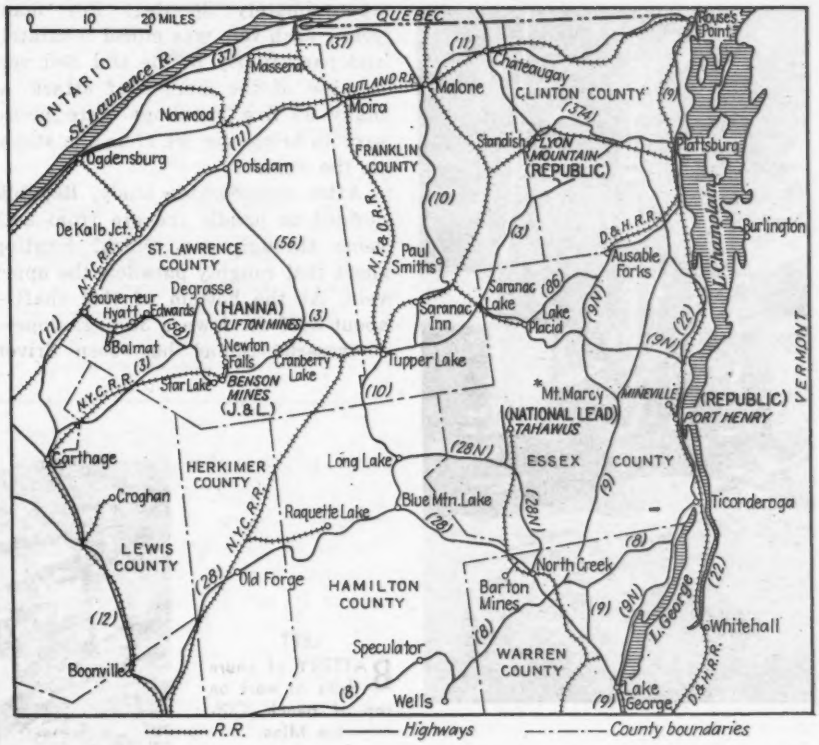
Expansion Began in 1938

The importance of the Adirondack ore bodies, as a hedge against the foreseeable depletion of the great Minnesota ranges, was first recognized by a large steel company when Republic Steel Corp. signed a 25-year lease of the Mineville and Port Henry properties of the Witherbee-Sherman Corp. This was in 1938. A year later Republic announced the signing of a similar lease of the Lyon Mt. mine of the Chateaugay Ore & Iron Co., 85 miles to the northwest. Both properties have been greatly expanded in output since then. There is every evidence that Republic is in the Adirondacks for keeps, including the step taken last July when the Chateaugay development was purchased outright from its parent, the Delaware & Hudson Co. The D. & H. had operated the property since 1903, although the mine has a much older history. With it went 140,000 acres of timberland and unexplored mineral resources. J. R. Linney, who was general superintendent of the D. & H. property for many years, is now manager of the Adirondack district of Republic Steel Corp. His son, Robert J., runs the Port Henry division, and his son, William J., is general superintendent of the Chateaugay division.

In 1941, for entirely different reasons, National Lead Co., New York, and M. A. Hanna Co., Cleveland, began the construction of crushing and concentrating plants at the sites of old mines at Sanford Lake (Tahawus) and Degrasse (Clifton Mine), respectively. See map. As has been indicated in a previous article[3] National Lead was primarily interested in exploiting a domestic source of ilmenite to supply raw materials to its titanium division. As will be seen later, under pressure of the WPB and with DPC funds, additional equipment has since been installed to sinter the byproduct magnetite concentrate. Hanna's action in reopening the old Clifton Mine tied in directly with the WPB steel industry expansion program initiated in 1941 and supplements its hematite properties in Minnesota. These are primarily privately financed projects. In 1942 surveys were begun at the site of the old Benson Mines, and later that year work was begun on a DPC financed concentration plant now operated by the Jones & Laughlin Ore Co.

Table II gives a comparison of the theoretical capacities of crude ore mining and sinter output for these various properties. Table III presents an estimate of crude ore reserves, while Table IV gives a partial analysis of the ores and sinter produced at each mine.

In general, the Adirondack magnetites occur in highly metamorphosed sedimentary rock consisting of quartz, hornblende, garnet, silmanite and feldspar, sometimes described as a feldspathic gneiss. In many of the deposits a fair percentage of the mag-



MAP showing the location of the five active mining properties. Three ore bodies are being worked in the Mineville-Port Henry area, two of them through a single shaft.

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TABLE II

Nominal Annual Capacities of Adirondack Magnetite Mines

Mine	Crude Ore Long Tons	Magnetite Sinter Long Tons
Benson (J. & L.)	3,000,000	1,000,000
Chateaugay (Republic)	1,300,000	425,000
Clifton (Hanna)	500,000	300,000
MacIntyre (Nat'l Lead)	1,200,000	600,000*
Mineville—Port Henry (Republic) Harmony, Old Bed	1,800,000**	1,000,000
Fisher Hill	2,500,000	1,000,000
Totals	10,700,000	4,325,000

* The primary product is ilmanite.
** 20 per cent of Old Bed ore is shipped as lump.

[3] *"Titaniferous Adirondack Ores Being Reworked," by Frank J. Oliver,* THE IRON AGE, *March 5, 1942, pp. 53-59.*

LEFT
BATTERY of churn drills at work on top of bench, Clifton Mine.

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RIGHT
WHERE the vein thickness is relatively narrow, open cut operations are limited in depth due to danger of falling rock. Below this point at Clifton underground mining will be employed.

netite is solid enough and free enough from gangue minerals to make a high grade direct shipping ore product. This is particularly true at Clifton Mine where the average Fe content is 42 per cent. Guaranteed analysis of Clifton lump ore is given in Table V. At Mineville, the ores range from lean varieties, consisting of magnetite intermixed with quartz, feldspar and hornblende, to those made up of practically pure magnetite, the richest averaging 60 to 70 per cent iron. The Chateaugay ores are lean—25 per cent Fe—but are numbered among the finest in the world because they run so low in phosphorus and sulphur and are copper free. The MacIntyre ores differ from the rest in that they average 16 per cent TiO_2 and about 33 per cent Fe, with about 0.2 per cent V. Some parts of the ore body consist almost entirely of magnetite and ilmenite. The leaner ores are mixed with gabbro—a term used to designate a dark colored, fine grained rock containing approximately equal amounts of feldspar and ferromagnesium materials.

Republic's Expansion

Although both the Republic Adirondack properties had been operated for years, until about 1941 the scale of operations has been relatively small and the practice both in mining and in milling was obsolete compared with today's standards. The Mineville deposits comprise two distinct ore bodies, the Harmony lying above the Old Bed vein and both dipping at approximately 30 deg. For many years, each vein was mined separately and particularly in the Old Bed vein because of the method of attack, as many as five handlings were necessary to bring the ore from the stopes to the surface.

After considerable study, Republic decided to handle the ore from both veins through one central hoisting shaft that roughly parallels the upper vein. At the bottom of this shaft—about 3600 ft. down a 30 deg. slope—a crosscut tunnel has been driven through rock to the Old Bed ore body from which point a new shaft is being sunk at a 30 deg. slope. A reconditioned hoist has been installed at this level and the only rehandling required is by trolley train between the two cable hoists. The new main shaft, which straightens out some old wiggles, has been christened the "Don B." in honor of Don B. Gillies, vice-president of Republic Steel. It is now the largest single shaft mine in the country. The new shaft went into operation in September, 1942.

Mining practice has been further improved by the purchase of up-to-date mining equipment, including wet drilling to suppress the dust hazard plus adequate ventilation. Through efficiency studies and consequent revision in drilling, blasting and scraping practice, the manhours expended per ton of ore has been reduced to almost one-third of its former value. Republic employs a bonus system based on tonnages produced.

Although most of the Old Bed ore is now being hauled out through the new Don B. shaft, the original Clonan vertical shaft sunk by the Port Henry Ore Co. to tap this body has been put back into use for the purpose of mining pillars in the old workings. About 500,000 tons of high grade ore has been recovered thus far, representing about one-half to one-third of the potential.

For its part in producing additional ore for the war effort Republic presented a plan to the DPC for development of the old Fisher Hill ore body, located within 2 miles of Mineville. Diamond drilling operation in 1921 had indicated the deposit would yield at least 40,000,000 long tons of crude ore. The mine had last been operated in 1893 and was flooded. Republic got approval to dewater the mine and modernize it in September, 1941. In order to feed a mill with an annual capacity of 2,500,000 long tons of ore, a three-track shaft was run down

2000 ft. on a slope of 33 deg., except for the first 400 ft. where the slope is 27 deg. to take advantage of an old excavation. The two balanced skip hoists, holding 17 long tons of ore each, travel at 2000 ft. a min., fastest in the East, and the hoist has a theoretical capacity of 8000 tons a day. For lack of trained miners, however, Fisher Hill is being currently operated at only about 20 per cent of capacity.

The DPC setup in this area also includes what is probably the finest concentrating plant in the world. Because of lack of miners at the Fisher Hill mine, Republic is processing Old Bed and Harmony ores through this mill, as well as output from the government-owned mine. For the present, the old No. 6 concentrator at Port Henry is idle. Incidentally, the Old Northern blast furnace at Port Henry was torn down in 1940. Sinter and lump ore is being shipped from here to Republic furnaces at Buffalo, Cleveland, Youngstown and Warren, Ohio.

Chateaugay History

The Chateaugay development has a commercial history going back to 1873 although the ore body was known as early as 1823. For years this ore, which in the early days ran 55 per cent iron, served 20 Catalan bloomery forges located at Belmont, on the lower (northern) end of Chateaugay Lake. Crude as this process of making wrought iron directly from ore was, the analysis of the blooms showed that a high-grade product could be obtained largely due to the quality of the ore. In 1885 a charcoal blast furnace was built at Standish, a few miles away where some forges had also been located. Later the Belmont forges were moved here and in 1904 the blast furnace was converted to coke. This was a small stack with a capacity of about 500 tons a day and after the D. & H. took over in 1903 it specialized in custom-made pig irons in small lots. This furnace went out of blast in 1936 and when Republic leased the property in 1939 the stack was torn down. Today Chateaugay low phos ore and sinter goes to the Troy furnace and to Buffalo to be made into merchant pig iron.

Under Republic management, present-day operations at Lyon Mt. are on a tremendous scale. In 1918, for comparison, 114,140 gross tons of crude ore were mined. By 1937 output had been pushed up to 818,000 tons and in 1943 to 1,323,000 tons. Output is thus ten times greater than it was in the last war.

TABLE III

Adirondack Crude Ore Reserve.

Mine	Long Tons	Recovery Ratio
Benson	Indefinite	1:3
Chateaugay	400,000,000*	1:3
Clifton	Indefinite	1:170
MacIntyre-Sanford Hill	15,000,000**	1:2
Mineville—Harmony	60,000,000	1:1.8
Mineville—Old Bed		
Mineville—Fisher Hill	40,000,000	1:2.5

* "Very probable" (1934).
** To lake level only. An additional 24,000,000 long tons is indicated or inferred.

The present shaft at Lyon Mt. goes down 2350 ft. at an angle of 63 deg. in the middle of an ore shoot that is several thousand feet long at the surface and has an average mineable thickness of about 15 ft. of 25 per cent iron. The vein is tapped from the shaft at intervals varying from 150 to 300 ft. From the various levels the ore is dropped down to a jaw crusher which reduces the ore to 8-in. chunks before it is raised to the surface. This is the only mine in the area where crushing is done below surface.

Sintering was begun in 1921. Magnetic concentration had been known and practiced here and at Port Henry years before, but steady improvements were made. In 1925, the separator plant had been enlarged and modernized, but it was only in the last summer that wet magnetic separation entirely replaced dry separation at Chateaugay. This was done for several reasons: To bring the plant up to the operating efficiency of the newer installations in the Adirondacks, to suppress dust, raise the iron content of the sinter and reduce the loss of iron in the tailings.

Benson Mines

The DPC has its second largest stake on the other side of the mountains, 100 miles west of Lake Champlain at Benson Mines, operated by the Jones & Laughlin Ore Co., subsidiary of the J. & L. Steel Corp.

In this connection it should be noted that there are several important differences between the various contracts entered into by the DPC as to type of lease, rental charges and means of future acquisition by the leasee. Some are long term; others are short term, a factor which obviously influences the capital write-off charges. Leases are all on a royalty basis of so much per gross ton of lump ore or sinter shipped from the concentrator plant. At Benson Mines the DPC has an investment of about $7 million, and the lease runs for 10 years. If at the end of 10 years, J. & L. exercises its option to buy the plant, accumulated rental charges may go to offset the purchase price, but in no event shall the purchase price be less than 10 per cent of the original DPC investment. An accumulated annual charge of 3 per cent interest on the original

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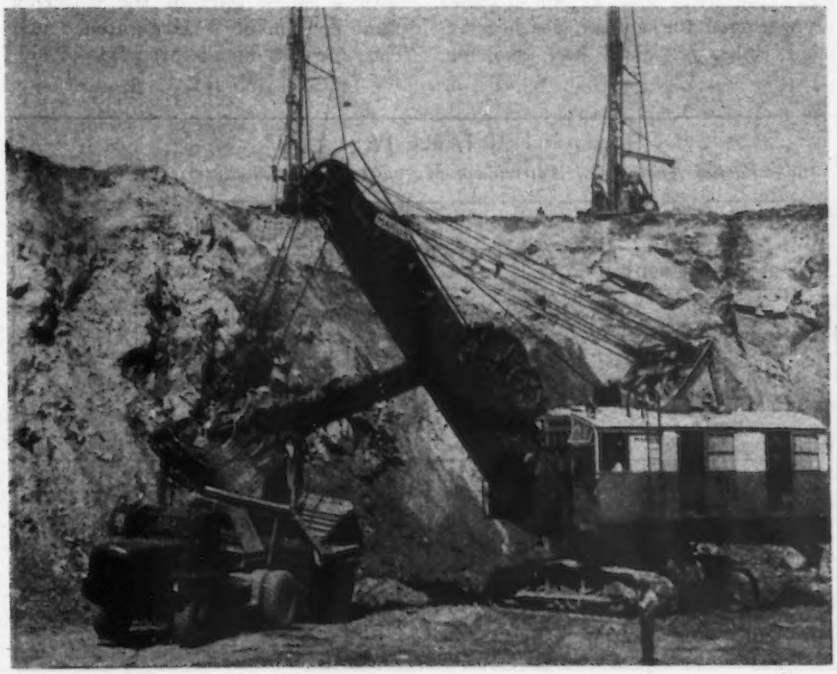
SHOVELS powered either by diesel engine or electric motor are used to load 35-ton trailer trucks at Benson Mines. Churn drills are on the upper bench.



investment would also have to be met at that time.

Benson Mines is an old property. It was first extensively worked for a few years, beginning in 1889, by the Magnetic Iron Co., then it was shut down. During the World War the Benson Mines Co. operated the property for a few years. Altogether about 500,000 tons of ore was removed. Until J. & L. put a survey party in the field in 1941, no attempt was made to explore the ore body which outcrops in spots and in other places lays under various thicknesses of glacial overburden. The original plan was to erect a concentrating plant with an annual capacity of 400,000 long tons of sinter. At WPB request, this capacity was raised to 1,000,000 tons. Since the plant only got into operation last February, only half this output will be attained in 1944.

About 27 per cent of the ore body is on land owned by the Newton Falls Paper Mill, jointly owned by McGraw-Hill Publishing Co. and the Chilton Co., parent of THE IRON AGE. The J. & L. Ore Co. has leased 382 acres of the paper company land and has agreed to mine this end of the ore body proportionately. The Newton Falls mill is three miles north of Benson Mines.

With its own funds, in 1941, National Lead Co. took over the old properties of the MacIntyre Iron Co. at Sanford Lake and vicinity in Essex County, primarily to obtain the ilmenite from what is possibly the largest deposit of titaniferous iron ore in the country. Ilmenite, which is TiO_2 associated with FeO, is processed into titanium dioxide (TiO_2) as a paint pigment; also as an opacifier or whitener for rubber, leather finisher, inks, oil cloth and linoleum, paper and as a mineral in welding electrode coatings, and for many other purposes.

TABLE V

Guaranteed Analysis of Clifton Sinter and Lump Ore, Per Cent

Elements	Sinter	Lump Ore
Fe	62.55	58.98
P	0.027	0.124
S	0.040	0.327
Mn	0.27	0.31
SiO_2	5.54	8.9
Al_2O_3	2.41	1.73
CaO	2.05	3.25
MgO	1.56	2.13
Ignition loss	1.60	2.13*

* Gain.

National Lead Co. financed the erection of mill buildings, roads and stripping operations, for the much more elaborate process of separating ilmenite from the magnetite as well as the country rock. Since July, 1942, until this past summer, magnetite concentrate was piled up—600,000 long tons of it—until by WPB insistence and with DPC funds a sintering plant could be engineered, erected and put into operation. In the interim, the principal use made of this finely ground concentrate has been as an aggregate in concrete block used for ship ballast. The block is cheaper than lead and can be readily handled in bulk. Some magnetite has been shipped to blast furnace operators having excess sintering capacity.

The DPC sintering plant started experimentally last summer but will not make much of a dent into the stock pile of magnetite concentrate until a minor part of the sintering plant equipment is straightened out. Thus far only small shipments of sinter have been made. Rated capacity of the sintering plant is 1800 long tons a day.

Big Ore Reserves

National Lead is working only one of the titaniferous magnetites in this area. Aside from the original workings known as the Mill Pond, there are deposits of rich ore (more than 45 per cent iron) on nearby Iron Mountain and a small deposit of lean ore at Cheney Pond. Only the Sanford Lake and Iron Mountain deposits are considered worthy of development, however. National Lead estimates that down to lake level on Sanford Hill there are 15,000,000 tons of ore in a body averaging 550 ft. in width and 1500 ft. long. From a magnetic survey made in 1908, the MacIntyre Iron Co. estimated there was 63,000,000 tons of rich ore in all four bodies down to 200 ft. The history of older mines in the Adirondacks points to the fact that these ore bodies extend underground indefinitely, so that theoretically National Lead may be said to have a reserve that will keep the mill operating indefinitely. The fact that a large investment of private funds has been made in this development lends the whole venture a permanent character.

Vanadium Possibilities

Ever since National Lead reopened the old workings on Sanford Hill, the WPB, the Bureau of Mines and the U. S. Geological Survey has also been urging that the vanadium content of this ore be exploited. There is about 0.2 per cent V in the Sanford Hill and adjacent deposits, amounting to about 36,000 net tons of vanadium[4]. Experiments on the reduction of the ore have been made at the University of Minnesota Experiment Station[5]. Work has also been carried on by Bethlehem Steel Co.[4] with a view to the successful running of titaniferous magnetites in the blast furnace and the subsequent recovery of the vanadium. The magnetite sinter is reduced in a blast furnace to pig iron containing the vanadium, followed by concentration of the vana-

TABLE IV

Partial Analysis of Adirondack Magnetite Ores and Sinter, Per Cent

ORE BODY	CRUDE ORE Fe	P	S	SiO_2	TiO_2
Benson	23	0.18	Variable	....	....
Chateaugay	25-26	0.005	Low	....	....
Clifton	42	0.127	0.4 4.7	....	....
MacIntyre	33	Trace	Low	10	16.0
Mineville—Port Henry					
Harmony	35	0.030	....	....	....
Old Bed	47	1-1.25	....	....	....
Fisher Hill	30	0.005	....	....	....
			Sinter		
Benson	64.5	....	....	....	....
Chateaugay	66-67	0.005	....	....	....
Clifton	62.5	0.027	....	5.5	....
MacIntyre	57	Trace	0.12 max.	3.6	9-10
Mineville—Harmony, Old Bed, Fisher Hill	68-70	0.025 0.25 0.005	....	....	....

[4] *For a detailed analysis of the geology of these deposits, with particular reference to the vanadium content, see "Vanadium-Bearing Magnetite-Ilmenite Deposits Near Lake Sanford, Essex County, N. Y.," Geological Survey Bulletin 940-D, obtainable from the Superintendent of Documents, U. S. Government Printing Office, Washington, 60c.*

[5] *See "Smelting of Vanadium-Bearing Titaniferous Sinter in an Experimental Blast Furnace," by Wood, Joseph, and Cole, Bureau of Mines Report of Investigations 3679, January, 1943.*

dium in a slag produced from the pig iron in a Bessemer converter. By the methods employed experimentally at the Bethlehem Steel Co., vanadium can be recovered from these Sanford Hill ores only if the magnetite concentrate contains more than 0.3 per cent V_2O_5 and the ratio of TiO_2 to V_2O_5 is less than 9. On the other hand, other tests have shown that an ore charge containing more than about 2.5 per cent TiO_2 could not be smelted successfully in a blast furnace, necessitating the mixing of Sanford ores with other magnetites.

The Federal Government has been so interested in the MacIntyre Mines of the National Lead Company, due to the strategic character of its products, that they have built and put into operation, as a project of the Defense Plant Corp., a railroad extension from North Creek, the terminus of the Adirondack Division of the Delaware & Hudson Railroad, to Tahawus on Sanford Lake. Built to standard New York State specifications with a 100 ft. right of way and all necessary safety appurtenances, this railroad cost millions of dollars and will be utilized for the transportation of materials important to the program of national defense.

Clifton Mine

The Clifton Mine, located 13 miles north of Benson Mines, is purely a private development of the Hanna Ore Co., a subsidiary of the M. A. Hanna Co., Cleveland. Like all of the other Adirondack magnetite deposits, this body was not a new discovery. It had been worked for about 20 years beginning in 1868, but not more than 10,000 tons of ore was taken out during this period. As can be seen in Table I, this is the smallest of the six Adirondack magnetite mines in point of annual capacity. In a little over two years of operation about 300,000 long tons of lump ore and sinter have been shipped. Clifton is also the most remote in that there are no large towns within 40 miles of the mine and plant.

Clifton will be the first of the open pit mines to go underground. Because of the amount of overburden and the slope of the ore vein (30 deg.), it will not be possible economically to excavate deeper than 120 ft. The shovels are already down to that level now at one end of the pit. In anticipation of this condition, a vertical shaft has been sunk down 270 ft. and a horizontal tunnel driven to intersect the ore body about 150 ft. vertically below the bottom of the pit.

To tap this ore the Hanna company extended the railroad (N. Y. Central) 10 miles north from its former terminus at Newton Falls, all of the distance over private land. The extension follows the grade of an old logging railroad and hence was put in with a minimum of expense. However, there are severe grades both ways, necessitating that the ore train be broken up into units of six cars to be pulled over the humps. Because of this practice, it takes a steam locomotive 3 hr. to bring down 18 or 20 ore cars.

Despite all its generous grading and wide cuts, the DPC railroad from North Creek to Tahawus has its grades too, but all uphill. The severest grade is 2.07 per cent. Several months ago, a 1500-hp. diesel locomotive replaced the 1000-hp. diesel originally chosen for pulling the empties up. (The state insisted on either a diesel or an electric locomotive for this haul through the forest preserve.)

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THE primary crusher at Benson Mines is located with the truck level located at a point midway between ground level and the ultimate depth of the ore pit.

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Manpower Shortage Felt

Manpower shortages are being felt all over the mountains, where except for a number of paper mills and lumber companies, the chief activity has been handling the vacation trade. Even in the well-established communities like the Port Henry-Mineville area and Lyon Mt., there is a dearth of skilled help. The Chateaugay Division is least up against manpower shortages, since a self-sustaining "company town" has been built up over the years. The FHA has put up 480 family units at Mineville to house the influx of workers that never came. Restrictions as to social activity, pets and the barrack-like appearance of the project have done little to attract workers and their families to a spot not far from well traveled highways and good rail connections.

Buried in the wilderness 32 miles from the nearest passenger rail head or town of any size, National Lead's MacIntyre development has had to offer more inducements. With its own funds the company has erected 83 attractive family units, none of the detached houses costing less than $7,000, and has been granted permission to build 29 more to meet a waiting list. Rent is $5 a room. As might be imagined, time drags heavily during the long winter nights and the hardy pioneers dream longingly of the night life at Lake Placid, 22 airline miles to the north but 75 miles by roundabout roads. A state road through wild Indian Pass would tap a new labor market as well as a recreational area, but a road of this character would be subject to amendment of the State Constitution and it is not on the State's postwar road-building agenda—yet.

Clifton Mine is just as remote from populated districts, if not more so. Housing is limited and help is drawn from as far as 40 miles away. Benson Mines is near a couple of summer resorts which are mere hamlets in winter and J. & L. too must seek labor far afield. Fortunately, in all the open pit operations, the amount of manpower required is small compared to the investment in machinery, and the only real skill required is in handling a power shovel and in maintaining trucks and machinery—an everlasting job. In the deep pit mines, on the other hand, training a miner who can work safely at the face of the stope is a matter of years.

[In the second and concluding part of the article beneficiating methods at the different mines will be compared, primarily to give the reader an idea of the cost factors involved.]

Optimum Plate Width Determination In

By Dr. W. G. THEISINGER
Assistant to Vice President, Lukens Steel Co., Coatesville, Pa.

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ONE plate vs. two plate fabrication by welding forms the simplest example of the economics of balancing plate width extras against the cost of welding additional seams where narrower plates are employed in the fabrication of boilers, pressure vessels and like structures which may be built of plates. There should also be considered the influence of these factors on the volume of shop production and manpower requirements.

Fig. 1 shows a drum whose length is equal to or greater than its circumference, while Fig. 2 shows a vessel whose circumference is equal to or greater than its length. In either type of assembly, where the shorter dimension does not exceed 195 in. (which is approximately the maximum width of steel plate obtainable) a single plate may be employed. In such case, all the fabricating operations are confined to just one plate, generally of width in excess of 100 in. and as such subject to a "width extra" charge in addition to the base price.

To avoid width extras, two plates are sometimes used. This practice requires the handling of two plates instead of one, and more than doubles the number of fabricating operations to produce the same shell. To determine whether one plate or two plate construction should be employed, the cost of the additional fabricating operations required for the two plates should be compared with the higher initial cost of the one plate due to its width extra (See Table 1).

Vessels are also constructed as shown in Fig. 3, where the circumference of the vessel is large, and its length is in excess of the greatest width of a single steel plate which can be rolled. In vessels of such construction also, the widths of plates used exert an important influence on fabricating costs to a degree which can be determined by a consideration of the fabrication costs and of the width extras involved.

In the two piece shell, the narrow plates are joined together by means of a circumferential seam in the middle of the length of the vessel. The welding of the extra circumferential seam in the two plate construction is merely one item in fabricating cost. In addition, all other operations are doubled, such as handling, laying-out, trimming, beveling, heating, crimping the edges, reheating, rolling, assembling, cleaning, chipping, grinding and X-raying. Further extra operations required for the two piece type are resquaring and beveling edges for the round seam and rerounding the two courses and their fitup. The two plate type of construction illustrated must undergo a total of 53 operations, while fabrication of the one plate type of vessel involves only 23 operations.

The reduction of more than 50 per cent in fabricating operations, by the use of the one piece construction, results in economies in fabricating cost, in fabricating time, and in manhours required for fabrication. Most important to the fabricator is the possible increase in the plant's productivity, and hence in sales volume, without any expenditure for additional plant or machinery.

Unnecessary Fabricating Operations

What are the costs of the additional fabricating operations made necessary by the use of the two plate type of construction as compared with the one plate type of construction for the structures illustrated in Fig. 2?

To obtain reasonably accurate and reliable data on the cost of U-68 class construction (A.S.M.E. code for pressure vessels), intensive studies have been conducted over a period of several years at the Lukens Steel Co. While fabricating costs are known to be higher today, the studies were directed toward determining average costs that would represent a fair cross-section of the U-68 type of fabricating in normal times. Classes of fabrication other than U-68 can eliminate the cost figures herein on operations which are not employed, such as X-raying which is not required on U-69 work.

Table II is a typical example of the costs for the extra operations required in the fabrication of a two plate vessel, 2 in. thick. For comparison with the entire cost of the extra operations, the percentage relationship of each operation is given. It will be noted that the actual welding of the extra circumferential seam —simply one step in the overall fabrication picture—costs $5.60 per ft. or only 29.5 per cent of the entire $19.01 which is the cost per foot of seam of the extra fabricating operations required by the two plate construction. The one plate vessel in 2 in.

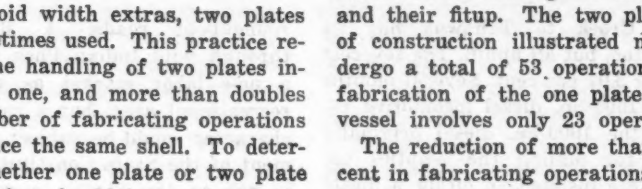
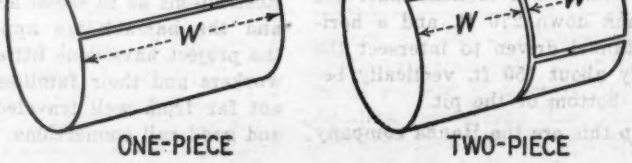


FIG. 1—This shape drum of a length equal to or greater than its circumference may be made of a single plate provided the shorter dimension does not exceed 195 in.

FIG. 2—A single plate may be used to make this drum having a circumference equal to or greater than its length which does not exceed 195 in.



In Fabricating Pressure Vessels

. . . A method applicable to tanks, boilers and pressure vessels of dissimilar shapes is presented herein which enables the fabricator to make a quick comparison of the cost welding vs. plate width extras. Additional details of this costing method pertinent to large shell fabrication, may be found in the author's paper presented last November at the annual meeting of the American Society of Mechanical Engineers.

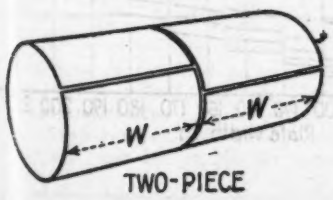
gage, can effect economy in fabrication cost of about $19 per ft. of seam, from which saving, the higher initial cost of the one piece plate, due to the width extra, must be deducted.

Saving Comparisons

Width extras for carbon steel plates are quoted by the mills in costs per 100 lb. The fabricator generally estimates his cost per foot of seam per vessel. Hence it is difficult to compare two dissimilar figures and know, for example, the relationship between a width extra of $0.05 per 100 lb. and a fabricating cost of $11.66 per ft. of seam. To overcome this confusion, it is desirable to translate the width extra per 100 lb. into width extra per foot of seam or per foot of length of plate.

Fig. 4 illustrates this common expression in a simple example of a 56 in. diameter vessel whose circumference is 176 in. with shell length of 108 in., made from a single plate 1 in. thick, 108 in. wide and 176 in. long. The theoretical weight of this plate, including the maximum overweight allowance of 5 per cent, is 385.5 lb. per ft. of length of the plate. For the width extra of $0.05 per 100 lb. for a plate 108 in. wide, the width extra per ft. of length of this plate is $0.19. To justify the use of two plates, the fabricator would have to perform all of the extra operations required by the circumferential seam at a cost of $0.19 per linear ft., or less. A good average figure for U-68 fabrication in 1 in. thick steel plate has been found to be $11.66 per linear ft. Thus, using the one plate shell the fabricator pays $0.19 additional per linear ft. of steel plate, but saves himself a fabricating cost of $11.66 per linear ft., or a net economy of $11.47 per linear ft. As the length of the circumferential seam is 14 ft. 8 in., the saving of $11.47 per linear ft. becomes $168.22 for the entire shell. The width extra was $1 per ton; the net fabricating cost saved by paying it amounts to $59.50 per ton.

FIG. 3—Widths of plates used greatly affect fabrication costs of vessels having large circumference and length in excess of greatest width of steel plate that can be rolled.



Converting to other units, the fabricating cost of $11.66 per ft. becomes $3.025 per 100 lb. By the one plate construction the fabricator saves the difference between the width extra of $0.05 per 100 lb. and his additional fabricating cost of $3.025 per 100 lb. or a saving of $2.975 per 100 lb. or $59.50 per ton.

As the width of the plate increases, the width extra per 100 lb. also increases in steps. A comparison of width extra per ft. or per 100 lb. with the fabrication cost per ft. or per 100 lb. will determine the optimum plate width.

In Table III are given fabrication costs for U-68 construction, per foot and per 100 lb., for circumferential welding and longitudinal welding, and the width extra per foot and per 100 lb., for plate of several gages and widths.

In the case of ½ in. plates in the various widths, it can be seen that the width extras per foot or per 100 lb. never equal the fabrication cost per foot or per 100 lb. for circumferential welding and consequently the wide plate is always justified for the fabricating costs given. For example, with ½ in. thick plate 192 in. wide, the width extra per foot in circumferential welding is $6.98 compared with a fabricating cost of $8.51 per ft., or on the per 100 lb. basis, the width extra is $2 while the fabricating cost is $2.44.

For a 1 in. thick plate, the width at which width extras and fabrication costs balance is about 185 in.; for a 2 in. thick plate, width extras and fabrication costs balance at about 176 in.

As Table III indicates, the thickness of plate must always be considered in determining the optimum plate width and the calculation for any given gage cannot be applied directly to other gages in the same width. While these fabrication costs are acceptable averages for U-68 construction, they will differ for other grades of construction; the fabricator should compute his own fabrication costs for comparison with width extras to determine the optimum plate width in a given gage, for any grade of construction other than U-68, always being careful to include all items of fabrication costs.

Fig. 5 shows U-68 fabrication cost per 100 lb. converted from the stated

TABLE I

Width Extras for All Plates, Rectangular or Otherwise

Applies to plates ¼ in. or over in thickness, and when ordered to weight per sq. ft., not less than 11 lb.

Widths, in.	Per 100 Lb.
Over 100 to 110 incl.	$0.05
Over 110 to 115 incl.	0.10
Over 115 to 120 incl.	0.15
Over 120 to 125 incl.	0.25
Over 125 to 130 incl.	0.50
Over 130 to 140 incl.	0.75
Over 140 to 155 incl.	1.00
Over 155 to 170 incl.	1.25
Over 170 to 185 incl.	1.50
Over 185 to 195 incl.	2.00
Over 195	On Application

Width Extras for Wide Light Plates

Applies to all plates, rectangular or otherwise, under ¼ in. thick or less 11 lb. per sq. ft.

Widths, in.	Per 100 Lb.
Over 72 to 84 incl.	$0.10
Over 84 to 96 incl.	0.20
Over 96 to 100 incl.	0.30
Over 100 to 110 incl.	0.40
Over 110 to 115 incl.	0.45

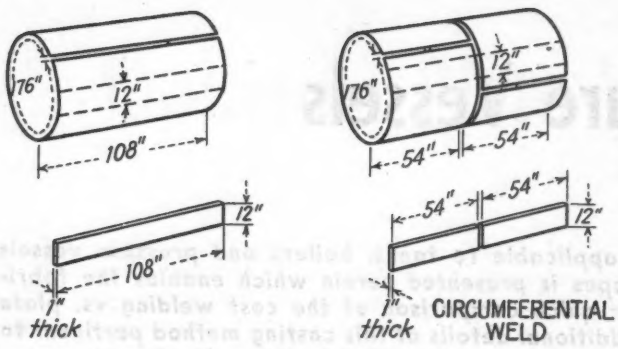


FIG. 4—By using a single plate in the fabrication of this vessel instead of two plates, a considerable net fabricating cost is saved.

fabrication cost per foot for two piece construction and also the width extras per 100 lb. The width extras per 100 lb. charged by the steel plate industry are shown in the form of steps for widths over 100 in. Fabrication cost per 100 lb. for the two piece construction by circumferential welding is shown for certain gages from ½ in. to 4 in. inclusive.

Use of Fig. 5 is illustrated by the following example: a two piece construction by circumferential welding of a shell 144 in. long and 1 in. thick would require two plates 72 in. wide. As shown in Fig. 5 on the 1 in. gage curve, fabrication costs $2.30 per 100 lb. ($11.66 per ft.), while one piece construction from a plate 144 in. wide would involve a width extra of $1 per 100 lb. The one piece construction would save $1.30 per 100 lb. in fabricating cost, or $26 per ton of steel plate used in making up the shell.

Optimum Cost Determinations

The point at which a curve crosses the width extra line in Fig. 5 indicates the plate width for which the width extra equals fabrication cost. On any curve at any width to the left of the width extra line, it is more economical to pay the width extra and use one piece construction. At any width to the right of the width extra line, it is cheaper to weld two plates to form the shell or cylinder providing manpower is available for extra shop work and production volume is not a major factor.

While Fig. 5 is based on circumferential welding, it is applicable also to longitudinal welding. As a consequence of the more favorable position in which the welding is performed, the fabrication cost for longitudinal welding is slightly lower, and the curves would be somewhat lower for longitudinal welding. Costs for U-68 longitudinal welding as compared with circumferential welding are also given in Table III.

To simply the comparison of width extras and fabrication cost, the width extras have been converted to cost per foot of length of plate as given in Fig. 6. The fabricating costs are shown on the graph by broken horizontal lines at levels corresponding to the values tabulated on the chart for various gages of plate. These costs are based on the data given earlier. If a fabricating cost differs from the value tabulated, a horizontal line should be drawn at a level representing that cost and the point of intersection with the corresponding width extra curve should be determined. This point gives the optimum width of plate for that fabricating cost. Curves for intermediate

FIG. 5—Chart for determining optimum width of plate: The point at which a curve crosses the width extra line indicates the plate width for which the width extra equals fabrication cost.

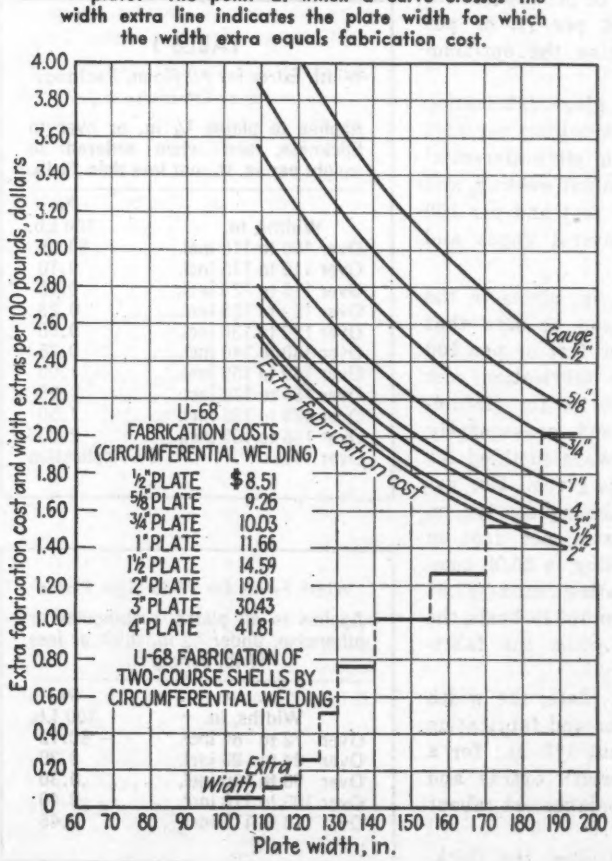
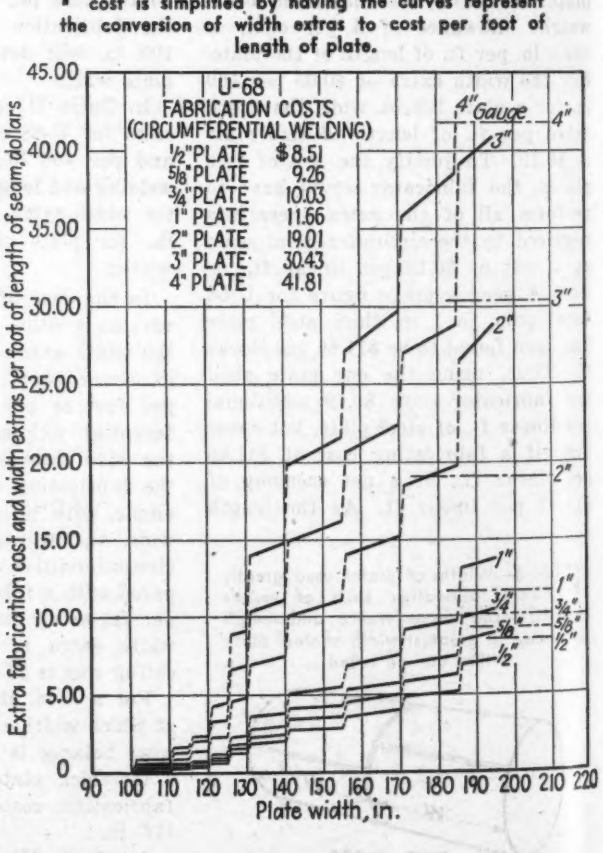


FIG. 6—Comparison of width extras and fabrication cost is simplified by having the curves represent the conversion of width extras to cost per foot of length of plate.



gages may be plotted as so desired.

With a 1 in. plate having a fabricating cost of $11.66 per ft., Fig. 6 indicates that the width of plate should be as great as the design permits up to 185½ in. With a 2 in. plate, at a fabricating cost of $19.01 per ft., the cost crosses the 2 in. width extra curve at a width of 179 in., indicating that the use of any two plate construction to make up a dimension of less than 179 in. would be more costly than a single plate construction. A single plate 2 in. thick and 140 in. wide would cost $7.50 per ft. for width extra. If the fabricator elected to weld two plates each 70 in. wide to form the 140 in. wide shell, at a cost of $19.01 per ft. of length, he would be doing so at the loss of $11.51 per ft. of seam. If the length of the plate is in the circumferential direction and the length of the seam is 30 ft., the excess cost in fabricating the two piece construction would be $345.30 for the vessel.

A similar analysis may be made for a cylindrical vessel in which its length is greater than the widest plate which can be rolled, namely 195 in.; in such a case, the length of the plate, as rolled, forms the circumference of the vessel, and the width of the plate becomes part of the length of the shell. For example, the diameter may be 10 ft. and the length 18 to 26 ft. Two piece and three piece constructions of such a vessel are shown in Fig. 7. With three piece construction an additional circumferential seam has to be fabricated with consequent fabricating additional cost.

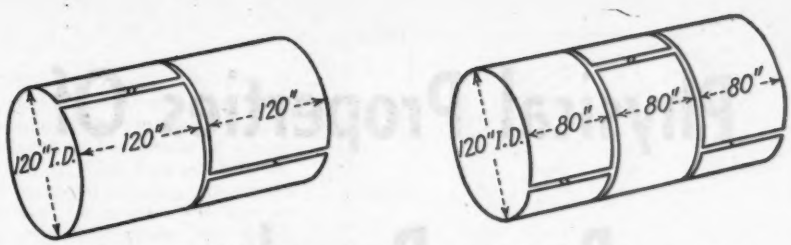


FIG. 7—By using two wide plates and avoiding thereby the extra circumferential seam, there is a saving in manhours as well as costs in the fabrication of this vessel.

A 20 ft. long drum may be made of two courses each 120 in. wide or three courses each 80 in. wide, as shown in Fig. 7. The 120 in. plates save the fabricating cost of one seam, and cost a total width extra for the two plates of $59.30. With three 80 in. plates, 1 in. thick, the cost of making the additional circumferential seam is $11.66 per ft., or a total of $380.93. All figures used herein include normal overweight allowances, metal and width extras, involved in the overweight. The wide plate construction saves the difference between these two costs, or $321.63 per vessel. In addition 127 manhours have been saved in fabricating the vessel with wide plates.

For a detailed discussion of shell fabrication involving as many as 8 courses and extending in length from 18 to 64 ft., the reader is referred to the author's paper presented at the annual meeting of the A.S.M.E., last November.

In long vessels constructed of multiple courses, plates more than 130 in. wide appear to be at a disadvantage if cost figures alone are taken into account. However, the other benefits derived from their use, such as the reduction of manhours and of the equipment needed for fabrication, may offset the higher cost of wider plates. Consider a cylindrical shell 30 ft. long of ½ in. gage. It may be made of two plates each 180 in. wide, or three plates 120 in. wide with an extra weld seam, or four plates 90 in. wide with two extra weld seams. For the two course shell the only extra cost is the width extra applicable to 180 in. plates, in this instance totaling $343.66. The three course shell requires an additional seam costing $268.49 and has a width extra of $51.96 or a total extra cost of $320.45. The three course shell saves only $23.21 in comparison with the two course shell, but requires 89 more manhours in fabrication to effect this small economy, or, two men were employed for a 45 hour week to save $23.21. If these two men had been employed in the production of additional vessels a greater income

(CONTINUED ON PAGE 149)

TABLE II

Extra Fabricating Costs* for Circumferential Seams, U-68 Construction 2 In. Thick Plate

Operations	Extra Cost* per Ft. of Seam	Per Cent Extra Cost
Layout	$ .42	2.21
Trimming	.60	3.14
Machining	.92	4.84
Heating and crimping	1.50	7.89
Heating and rolling	2.36	12.41
Shot-blasting	.22	1.16
Fitup	.84	4.42
Extra welding long seam	.87	4.58
Clear, chip and grind	.29	1.53
Reround	.83	4.37
Resquare and bevel	1.25	6.58
Fitup	.83	4.37
Weld circumferential seam	5.60	29.46
Chip and grind	.72	3.78
X-ray	1.76	9.26
	$19.01	100.00

These cost figures include 133 per cent shop burden, but not sales or administrative expense or profit. Shop burdens have been found to vary from 100 to 200 per cent.

TABLE III

Fabrication and Width Extra Cost Per Foot and Per 100 Lb.
U-68 Construction

Plate Size, In.	Total Weight, Lb.	CIRCUMFERENTIAL WELDING				LONGITUDINAL WELDING			
		Cost Per Ft.		Cost Per 100 Lb.		Cost Per Ft.		Cost Per 100 Lb.	
		Fabrication	Width Extra	Fabrication	Width Extra	Fabrication	Width Extra	Fabrication	Width Extra
12 x 108 x ½	190.9	$8.51	$0.10	$4.46	$0.05	$6.81	$0.10	$3.57	$0.05
12 x 120 x ½	213.2	8.51	0.32	3.99	0.15	6.81	0.32	3.19	0.15
12 x 132 x ½	236.7	8.51	1.78	3.60	0.75	6.81	1.78	2.88	0.75
12 x 144 x ½	259.5	8.51	2.60	3.28	1.00	6.81	2.60	2.62	1.00
12 x 160 x ½	288.2	8.51	3.60	2.95	1.25	6.81	3.60	2.36	1.25
12 x 174 x ½	316.5	8.51	4.75	2.69	1.50	6.81	4.75	2.15	1.50
12 x 192 x ½	349.2	8.51	6.98	2.44	2.00	6.81	6.98	1.95	2.00
12 x 108 x 1	376.4	11.66	0.19	3.10	0.05	9.33	0.19	2.48	0.05
12 x 120 x 1	420.2	11.66	0.63	2.77	0.15	9.33	0.63	2.22	0.15
12 x 132 x 1	464.5	11.66	3.48	2.51	0.75	9.33	3.48	2.01	0.75
12 x 144 x 1	509.2	11.66	5.09	2.29	1.00	9.33	5.09	1.83	1.00
12 x 160 x 1	565.7	11.66	7.07	2.06	1.25	9.33	7.07	1.65	1.25
12 x 174 x 1	618.2	11.66	9.27	1.89	1.50	9.33	9.27	1.51	1.50
12 x 192 x 1	682.2	11.66	13.64	1.71	2.00	9.33	13.64	1.37	2.00
12 x 108 x 2	752.8	19.01	0.38	2.53	0.05	15.21	0.38	2.02	0.05
12 x 120 x 2	840.5	19.01	1.26	2.26	0.15	15.21	1.26	1.81	0.15
12 x 132 x 2	929.0	19.01	6.97	2.05	0.75	15.21	6.97	1.64	0.75
12 x 144 x 2	1018.4	19.01	10.18	1.87	1.00	15.21	10.18	1.49	1.00
12 x 160 x 2	1131.2	19.01	14.14	1.68	1.25	15.21	14.14	1.34	1.25
12 x 174 x 2	1236.4	19.01	18.55	1.54	1.50	15.21	18.55	1.23	1.50
12 x 192 x 2	1364.4	19.01	27.29	1.39	2.00	15.21	27.29	1.12	2.00

Physical Properties Of Brass Powders

. . . The advantageous properties of brass powder compacts has been overshadowed by the little available knowledge of proper sintering atmospheres. The results of experimental work in the laboratories of the New Jersey Zinc Co. on the sintering of 70-30 and 90-10 brass powders indicate that under proper sintering conditions excellent physical properties are obtainable.

BRASS, one of the most commonly used metals in wrought form, has received little attention in powder form in spite of its desirable properties after sintering. Early trials of brass powder by commercial fabricators indicated that atmospheres generally used in sintering iron and copper powders were not suitable. However, laboratory investigation by the New Jersey Zinc Co. has revealed several atmospheres which are satisfactory and, accordingly, this factor no longer should impede brass powder development.

The production of a brass powder by atomizing a molten alloy yields a dendritic structure in the particles and greatly increases the ease of obtaining excellent properties in the final sintered compact. Inferior results are generally obtained when mixed copper and zinc powders are used for making the compact.

It has been found that the mechanical introduction of a small amount of phosphorus (less than 1 per cent) as phosphor-copper powder materially increases the tensile elongation, decreases the optimum sintering temperature, and broadens the sintering range. Brass powders Nos. 1104 and 1113 referred to below have phosphorus added.

In atomizing brass powder, a wide distribution of particle size results. However, it is feasible to narrow this range by screening or other methods of separation and some control of particle shape is also possible. For practical purposes, however, available powder is limited to irregular or spherical shape with rather wide particle size distribution.

The mechanical properties of sintered brass compacts depend on particle shape, size distribution and surface condition; on compacting conditions, as pressure, speed, lubrication and die design, and on sintering control, that is, atmosphere, temperature and time. Assuming reasonable control of these factors (which are problems of the powder producer and powder fabricator) the properties shown in Table I may be expected

TABLE I

Physical Constants of Specimens Made From Brass Powder

	70-30				90-10			
	No. 1101 Without Phosphorus		No. 1104 With Phosphorus		No. 1110 Without Phosphorus		No. 1113 With Phosphorus	
Compacting pressure, tons per sq. in.	30	50	30	50	30	50	30	50
Sintering temperature, deg. F.	1,652	1,652	1,562	1,562	1,688	1,634	1,670	1,616
Yield point, lb. per sq. in. (0.2 per cent offset)	15,900	18,800	8,600	8,800	11,500	14,100	9,200	10,300
Elastic modulus (10^6 lb. per sq. in.)	13.2	16.3	11.9	13.9	16.0	16.7	11.4	12.9
Shear strength, lb. per sq. in.	28,800	32,300	25,600	26,000	24,800	25,000	23,500	24,500
Tensile strength, lb. per sq. in.	29,100	35,200	32,000	34,900	26,100	28,400	27,400	29,700
Tensile elongation, per cent in 1 in.	11	13	43	50	15	13	31	34
Impact strength, ft.-lb. (¼ x ¼-in. bars)	11	13	22*	25*	11	13	25*	27*
Brinell hardness number (250 kg.)	43	51	35	39	38	49	35	41
Electrical conductivity, 10^4 mhos. per cc. (77 deg. F.)	12.58	14.32	9.78	10.84	18.91	20.32	8.16	9.39
Thermal conductivity								
Thermal expansion (10^{-6} mm. per 33.8 deg. F.)								
77 to 212 deg. F.	17.7	18.2	18.4	18.0	17.1	16.9	17.1	17.4
77 to 572 deg. F.	19.3	19.1	19.6	19.5	17.9	18.0	18.4	18.0
Compressive strength, lb. per sq. in. (10 per cent compression)	38,300	43,200	29,500	31,600	34,600	39,000	31,400	32,700
Density, gm. per cc.	.....	7.92	.....	7.94	.....	8.36	.....	7.99

* Pulled through without fracture.

in test specimens as sintered under laboratory conditions. Properties obtainable in commercial articles will fall short of those shown for specimens by an amount dependent on shape, tool design, lubricant and control of sintering.

In testing brass powder No. 1104, tensile specimens, 1.0 sq. in. in pressure area and about 0.1 in. thick, were compressed at 50 tons per sq. in. on a Baldwin-Southwark hydraulic machine, using a free head speed of 2 in. per min.

Optimum sintering times and temperatures were determined by sintering specimens in groups of two in a 1¼-in. diameter furnace for 0.1, 5, 15 and 30 min. at different temperatures using 50 cc. dry hydrogen per min. In each case the heat-up time was about 5 min. and the cooling time about 10 min. In the individual curves of Figs. 1 to 5, the time at temperature is indicated.

In making these tests, tensile strength and elongation were determined on the sintered specimens. Weight and dimensions were determined before and after sintering and the changes due to sintering were calculated. Densities after sintering were also calculated.

It was found that brass powder No. 1104, if sintered under conditions yielding maximum tensile elongation, has the following characteristics:

Tensile strength, lb. per sq. in.	38,600
Tensile elongation, per cent	55
Weight loss, per cent	1.2
Shrinkage (normal to compression), per cent	1.2
Density, gm. per cc.	7.79

Sintering under conditions to provide maximum density, or low shrinkage or low weight loss will generally result in a sacrifice of strength and ductility.

o o o

FIG. 1 — Tensile strength of brass powder No. 1104 compressed at 50 tons per sq. in. and sintered in two specimen groups in 1¼-in. silica tube using 50 cc. of hydrogen per min. Specimens were at temperature for time indicated, and curves are drawn up to blistering temperature.

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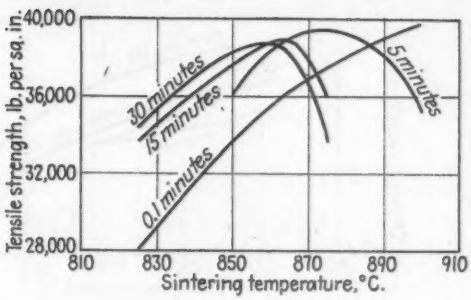


Within the temperature range investigated, increased sintering time at a given temperature results generally in increased strength or elongation up to the optimum temperature, as shown in Figs. 1 and 2. For sintering times of 5, 15 or 30 min., there is a reasonable range of temperature over which nearly optimum properties can be obtained.

Both weight loss and shrinkage of brass powder No. 1104 tend to increase with time and temperature of sintering. (See Figs. 3 and 4.) The density after sintering of brass powder No. 1104, shown in Fig. 5, more or less parallels tensile strength and elongation under varying sintering conditions.

Graphs on impact strength have not been included because this property has been least affected by changes in sintering conditions. Values in the range of 20 to 25 ft-lb. for ¼x¼-in. bars may be expected generally for the sintering conditions shown.

Temperature Determinations

In Figs. 1 to 5 it will be noted that specimens sintered 15 or 30 min. blistered at 1607 deg. F., while those sintered 0.1 or 5 min. did not blister until they reached 1652 deg. F. This difference may indicate some lag in the apparatus used for determining temperature. Other investigators using somewhat different techniques might show temperatures differing from those shown in this report by as much as 70 deg. F. Therefore, the temperature data shown must be viewed as qualitative and each investigator should work out the optimum conditions for his own equipment.

From the properties listed in Table I, it will be noted that brass compacts have yield strength and modulus similar to wrought brass, while properties in general are not widely different from those of cast brass.

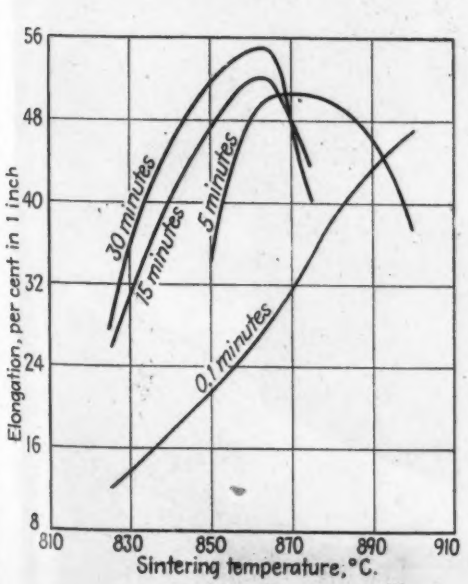
Compacts as sintered are frequently repressed or coined where close dimensional tolerances are essential. This has the expected effect of increasing tensile strength and density and reducing ductility. The ability to obtain close dimensional tolerances without machining is not common to any other production method except die or precision casting.

Dimensional tolerances to be expected on compacts as sintered are:

On diameter	±0.004 in. per in.
In direction of pressing	±0.008 in. per in.

Repressing or coining will improve the diameter tolerance to ±0.0005 in. per in. but probably will not change that in the direction of pressing. Closer tolerances can be maintained but cost proportionately more.

Repressing may be used also to increase density where maximum density is required. On the other hand, when neither maximum density nor maximum strength and ductility are necessary, simplification of fabricat-



LEFT

FIG. 2 — Tensile elongation of brass powder No. 1104 given identical treatment to that in Fig. 1.

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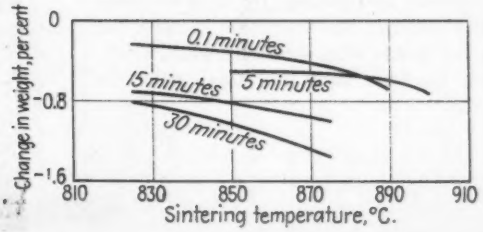
RIGHT

FIG 3 — Percentage change in weight of brass powder No. 1104.



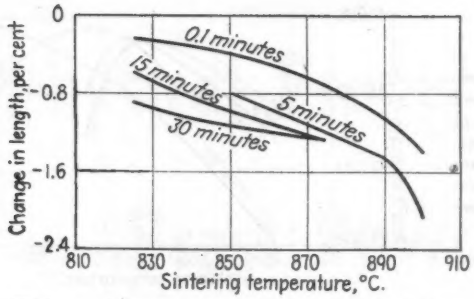


FIG. 4—Percentage change in length of brass powder No. 1104. From this and the graph in Fig. 3 it can be seen that both weight loss and shrinkage of this brass powder tend to increase with time and temperature of sintering.

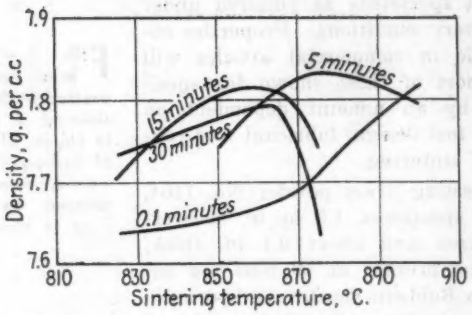


FIG. 5—Density of brass powder No. 1104 after sintering approximately parallels tensile strength and elongation under varying sintering conditions.

ing procedure and some economy in metal weight can be realized through compacting at somewhat lower pressures.

Some powder fabricators feel that in the present state of development of powder metallurgy, the largest field lies in those articles in which optimum properties are not necessary for the utility of the part; in parts which can be compacted at the lowest pressures providing adequate green strength and which can be repressed after sintering when close dimensional tolerance is desired.

Press Size Limiting Factor

Brass powder compacts in order to have sufficient green strength to be handled should be pressed at 25 tons per sq. in. or higher. Fabricating difficulties increase rapidly when unit pressures of much greater than 50 tons per sq. in. are used. Therefore, the size (cross-section normal to direction of pressure application) of a part to be considered for powder metallurgy is limited only by the size of the press available, bearing in mind the unit pressure limits stipulated. The length in the direction of pressure application is limited by design factors and by the press stroke —most powders have a compression ratio in the order of 2.5 to 1. Press strokes vary widely depending on type but rarely exceed 8 in. except in hydraulic machines.

In the final analysis, the decision to use brass powder must be based on one or both of two factors: (1) Economy, and (2) some unique feature of brass powder metallurgy which permits the solution of a particular problem. Economy may result from:

(1) Elimination of machining.
(2) Reduction of inventory stock.
(3) Elimination of expensive metallurgical processing.
(4) Reduction in weight.
(5) Reduction in scrap loss.

The unique features of powder metallurgy have been rather thoroughly discussed in trade literature. Some of those applying to brass powder are listed below:

(1) Incorporation of metallic elements which cannot be added to brass by fusion processes.
(2) Incorporation of metallic or certain nonmetallic inserts during the compacting.
(3) Addition of layers or sections of other metals during compacting. When properly chosen, these other metals form intermetallic bonds with the brass powder during sintering.
(4) Ability to make porous articles such as filters from spherical brass powder.
(5) Ability to make porous articles for absorbing lubricating oil either by compacting at low pressure or by adding to the powder a material which volatilizes during sintering.

Extrusions Bent With Self-Locking Form Blocks

HEAVY extrusions and bent-up sections are today being formed in slightly more than half the time previously required and production has been increased 68 per cent, thanks to self-locking form blocks devised by engineers trained in work simplification at the Glenn L. Martin Co., Baltimore. Under the new method a steel block with a dovetail slide is attached to the ram on the arbor press, with previous form blocks being reworked so they can be fitted into the dovetail slide. This eliminates the locating and holding of form blocks by C-clamps required by previous forming methods and permits the operator to work the arbor press with one hand while working the part back and forth with the other.

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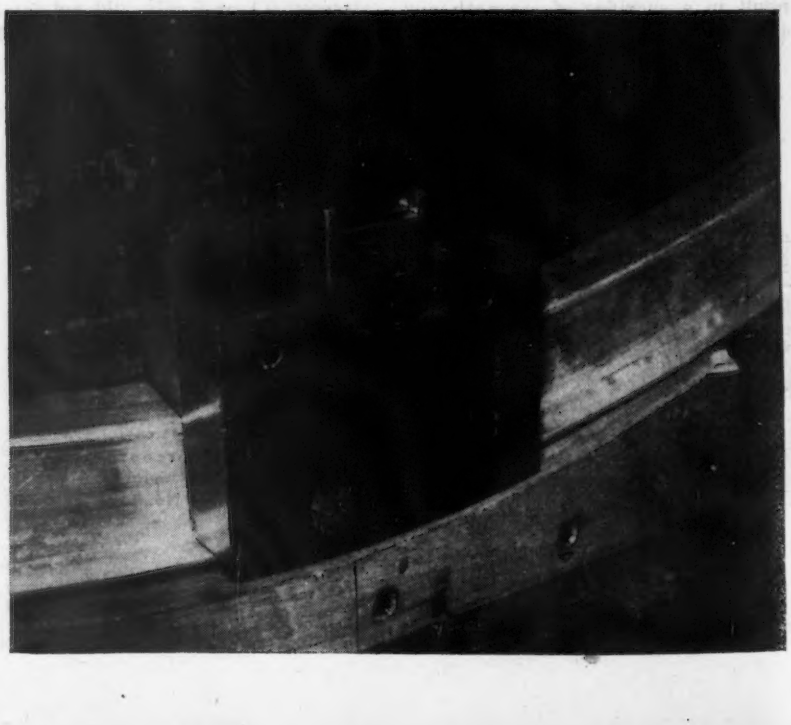
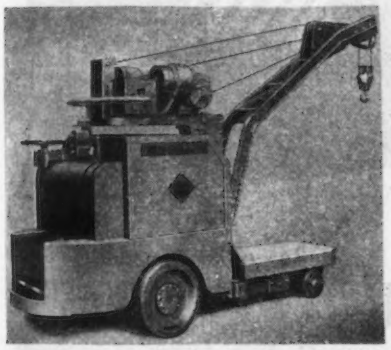


New Equipment . . .

Material Handling

. . . Recent developments in industrial trucks, cranes and other conveying equipment are described in the following pages

THE Model L-11C combination crane truck with a separate motor for raising and lowering the boom has been announced by *Elwell Parker Electric Co.*, Cleveland. The truck is a 4-way truck, serving as lift-truck, load carrier, crane and tractor. It has a capacity of 6000 lb. on the platform, 2000 lb. on the hook at 42 in. radius and 1000 lb. on the hook at 84 in. radius. It will travel at 6 mile per hr. with no load and 5 mile per hr. with full load. The



platform is deeply flanged to insure rigidity and has three point positive support to assure load stability.

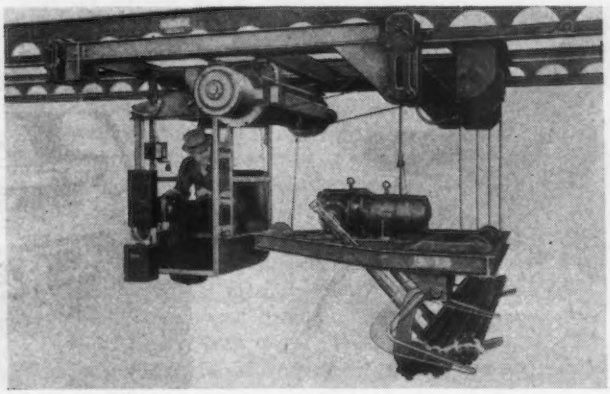
Self-Propelled Crane

A CRANE in which the turntable engine is used to power the carrier as well as the turntable has been announced by *Thew Shovel Co.*, Lorain, Ohio. All controls for crane and clamshell operations as well as for controlling the steering, the brakes, the choice of forward or reverse and the controls for two-speed transmission are located on the turntable within easy reach of the operator. Straight or gooseneck tip extensions are available. If desired, a gooseneck top section can be installed on the boom proper. Additional features include a loading platform on the front of the carrier to carry loads in transit, two telescopic style outrig-

gers with floats, automotive style lights and tow hooks at front of carrier.

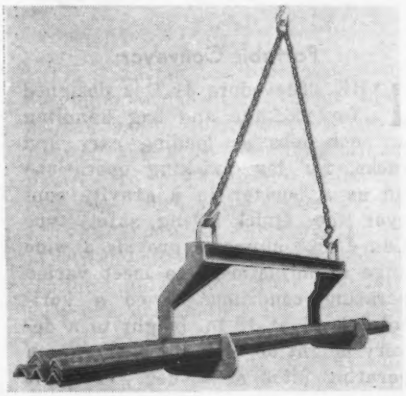
Pipe and Rod Carrier

A MOTOR-DRIVEN pipe and rod carrier developed by the *Cleveland Crane & Engineering Co.*, Wickliffe, Ohio, permits the cab operator to pick up 1500 lb. of stock in 12-ft. lengths from the storage room, transport and set it in racks at fabricating machines. The pick-up fork assembly has a 3-point rope suspension from the carrier which gives it the necessary rigidity for handling loads that are far out of balance. The carrier travels on an overhead track system. Rod and pipe are handled by two forks which are tilted upward or downward by a motor-driven crank. A limit switch automatically stops the forks in the upward or holding position when the fork mechanism is not in operation.



Bar Stock Sling

TO facilitate the handling of bar stock, rods, angle iron, heavy tubing and other materials of like character, a bar stock sling has been designed by *Palmer-Shile Co.*, 784 South Harrington Avenue, Detroit. The bar stock sling is built of heavy stock, is strongly braced and reinforced. It will take care of any

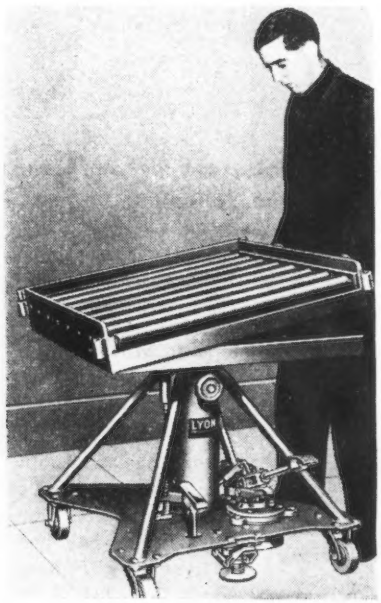


load up to 2000 lb. The cradle is 10 in. wide and 8 in. high. The sling is 5 ft. long and weighs approximately 50 lb.

Reversible Roller Top

AS an optional feature for its hydraulic elevating table, a removable and reversible roller top has been announced by *Lyon-Raymond Corp.*, 1773 Madison St., Greene, N. Y. The framework of

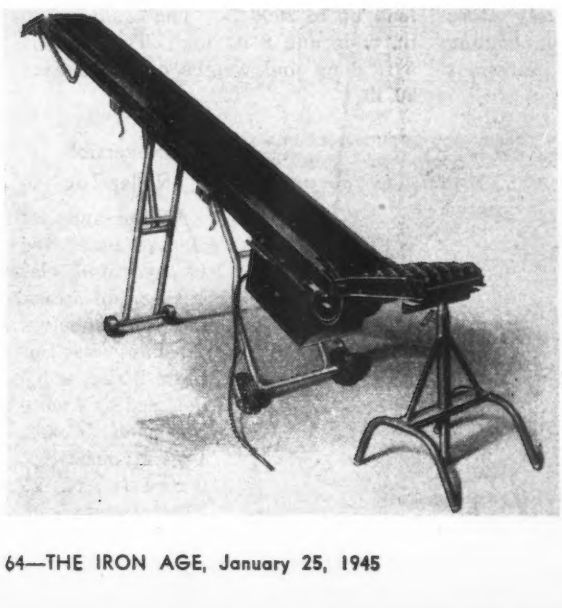
the top fits down over the permanent top eliminating the necessity for bolts or other fastenings. The roller top



consists of a rigid welded framework supporting ball bearing conveyor rolls. Since the table top is square, the top can be placed to convey from front to back or from side to side.

Portable Conveyor

THE "Stevedore Jr." is designed for package and bag handling for such jobs as loading cars and trucks, for low stacking operations and as a booster in a gravity conveyor line. Quick acting, safety-type "Cam-Lock" supports provide a wide range of adjustment to meet varied operating conditions, from a horizontal level at 18 in. height to a delivery height of 74 in. at a maximum operating pitch of 33 deg. The unit is built by the *Rapid Standards Co., Inc.*, Grand Rapids, Mich.



Transfer Car

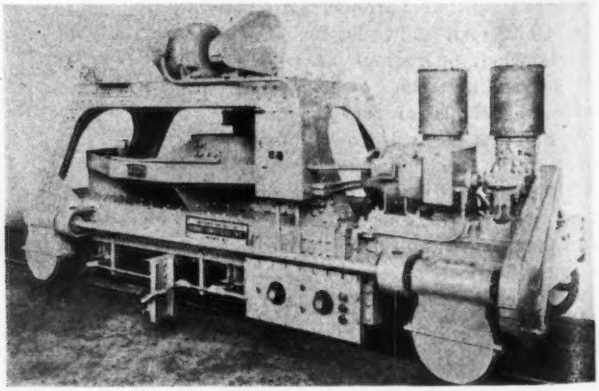
A 110-TON side dump diesel-electric ore transfer car to be used in blast furnace and steel plant service has been developed by the *Atlas Car & Mfg. Co.*, Cleveland. It is powered by two diesel engines, each rated 200 hp. at 1600 r.p.m. and each driving a suitable generator. Complete power equipment at each end of the car is synchronized electrically so that it can be fully controlled when operating on both power plants of either one of them from the control station in either cab.

Ore Truck

AN ore truck which will carry pay load of 68,000 lb. of ore has been developed by *Euclid Road Machinery Co.*, Cleveland 17. One of the special features of this truck is a Hydrotarder which controls speed on the long down grades without the use of service brakes. This device is located in the drive line back of the transmission and uses the principle of fluid friction. Mechanical energy generated by the descending truck is changed to heat in the Hydrotarder and is dissipated by the water in the cooling system. The truck is powered by a 150 hp. diesel engine and has a five-speed transmission. The side-dump trailer units used with the Euclid tractors were built by *Easton Car & Construction Co.*, Easton, Pa.

Rotary Plow Feeder

ROBINS CONVEYORS, INC., Passaic, N. J., announces the development of a rotary plow feeder which performs the double function of reclaiming and feeding ore, sinter, coal or coke. The unit automatically feeds coke from the wharf to a belt conveyor and regulates feed to the coke screening station. Operation is automatic. One motor rotates the



plows; a rheostat controls speed in a range from 1 to 8 r.p.m. Another motor traverses the feeder back and forth with a limit switch to restrict distance of travel in both directions and a separate rheostat to adjust rate of progress between 1.3 and 10.4 ft. per min.

Wet Magnetic Separator

A MAGNETIC separator to be used principally for concentrating of ores and minerals by the wet process has been announced by *Stearns Magnetic Mfg. Co.*, Milwaukee. The material goes into an enclosed spout and a controlled water pressure feed creates a high disseminating effect to spread the material in a thin, uniform layer to the underside of a submerged moving belt. Here it is picked up by the intercepting magnetic field and carried through the successive magnetic zones individually controlled by rheostats which provide a clean product of concentrates, middings and tailings. Clean separation if further augmented by a special patented design of magnet pole pieces which subject the material to a zigzag movement as well a a rolling, cleansing action while in process.

Copper-Oxide Battery Charger

A LARGE capacity automatic copper-oxide battery charger, 145F1, for charging electric truck batteries has been announced by *General Electric.* This combination charger has simplified controls, a d.c. contactor and is capable of charging 30 nickel alkaline or 24 lead-acid battery cells. The charger is 28¼ in. wide, 32¾ in. deep and 46¾ in. high. Nameplates show the method for changing the charging rate, the one-step operation of line voltage adjustment and the battery-cell adjustment. The d.c. contactor prevents batteries from discharging back through the charger after the a.c. current has been turned off or fails. It automatically shuts off when the charge is completed and can also shut off manually.

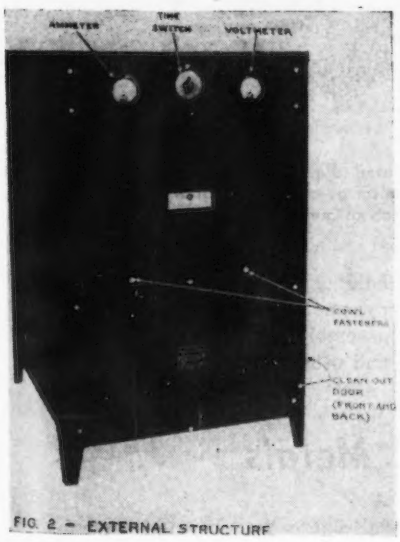


FIG. 2 — EXTERNAL STRUCTURE

Motive Power Service Battery

THE Exide-Powerclad battery for motive power service has been announced by *Electric Storage Battery Co.* The positive assembly is a plate completely enclosed by a slotted polysterene retainer. In combination with the separators it is said to assure effective retention of the active material and provides rapid diffusion of the electrolyte. This assures long life and capacity discharges at usable voltages throughout the life of the battery.

Extension Scaffold

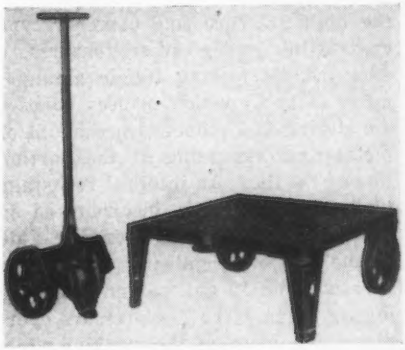
AN extension scaffold which comes in three standard sizes, ranging in height from 15 to 26 ft. to which 6 ft. is added to get the working height, has been announced by *Atlas Industrial Corp.*, 849 39th Street, Brooklyn, New York. Each unit is adjustable to meet not only maximum but also any intermediate height. Features of the scaffold include floor locks, adjustable outrigger braces and positive locking in any position. When collapsed, it readily passes through 7 ft. x 2 ft. 6 in. opening. The base straddles ordinary obstructions such as desks, lathes, etc. It is one man operated and easily handled in tight places.

Portable Belt Conveyor

A PORTABLE endless belt type conveyor has been announced by *Coaltoter Conveyor Co.*, 310 S. Michigan Avenue, Chicago 4. The conveyor is available in two lengths, 13 ft. 9 in. and 20 ft. Either model may be driven by an electric motor or a gasoline engine. The conveyor comes equipped with 1½ hp. gasoline engine or a 2.3 hp. engine for heavy-duty work. The conveyor is also available without the motor. Normal belt speed is 420 ft. per min. Variable speed drive pulley is available if desired. All models may be had with a standard engine mounting or a high engine mounting for conveying bulky material. Engine mounting on conveyors equipped with gasoline engine is adjustable to keep engine level regardless of angle of conveyor. The conveyor can be used for hauling sand, gravel, brick, clay, fertilizer, coal, etc.

Hand Truck

A TRANSPORT with a 4-way floor plate deck has been added to its line of material handling equipment by *Factory Service Co.*, 4615 North 21st Street, Milwaukee 9. The floor plate is welded flush with the top of the chassis on the angles of the frame. It is reinforced on the underside by two heavy angles. A "non-skid" feature keeps metal parts from "walking" off easily when the Transport is in motion. Embossments provide point contact with hot materials which allows some air space between them and the steel deck. Warping is eliminated in this way.



The transport is the foundational unit upon which other Turner equipment is based. It can be moved in restricted space by the hand Jimmy, power lift truck, crane, tractor or conveyor. With piling stakes, the load can be expanded vertically to any practical height. Steel or wooden bin sections and section trays also interlock one on another on top of the travel truck thus making bins available as high or low as the particular job requires.

Wire Reel Drums

FLANGED steel traverses or drums for reels and fluted type steel shipping reels for steel wire, wire rope and the copper cable and wire industries are now being produced by the *Hubbard Spool Co.*, 1622 Carrol Ave., Chicago, 12, in its Garrett Div., Garrett, Ind. The traverse is made of all types of reels—in standard sizes available in widths and diameters ranging from 6 to 60 in., and in plain, painted or hot dipped galvanized finish. The Garrett plant is also equipped to handle orders for special size traverses and drums. Traverses and reels are manufactured under a license arrangement with Western Electric Co., Inc.

Die Casting Setup in "Package" Form

A "COMPLETE die casting package" plan has been made available by the H. L. Harvill Mfg. Co., P. O. Box 335, Vernon, Cal., which includes the improved Harvill standard die casting machine and accessory equipment all designed to fit into a metal working production line. Where the factors involved dictate the necessity of modifications in the standard machine to fit the particular job, the Harvill company provides production engineering service, to the extent of building a fully automatic line of machines and auxiliary equipment where warranted. This service is also a part of the Harvill die casting "package."

The Harvill machine (Fig. 1) is of the high pressure cold chamber type embodying among other features, a patented die locking toggle arrangement (Fig. 2) which insures positive die closing and reduces the amount of metal flash occurring at the parting line of the dies. An integral two stage hydraulic system is incorporated in the design, delivering hydraulic fluid at the rate of 75 gal. per min. at low pressure and 15 gal. per min. at 1000 lb. per sq. in. The low pressure operates components of the machine while the high pressure fluid is for injection of the metal. A pressure as high as 88,000 lb. per sq. in. can be exerted by the injection piston on the molten metal, the normal pressure being 35,000 lb. per sq. in. The standard machine operates at 400 cycles per hour.

An outstanding feature of the machine is the ability to pull cores of a die in four directions. Heavy tie bars and oversize platen bearings assure accurate die positioning and T-slots in the platen allow for fast die mounting. The movement of the platens permit wide die opening, facilitating casting removal as well as die mounting. Automatic timing controls is provided for all operations except the ladling of the metal.

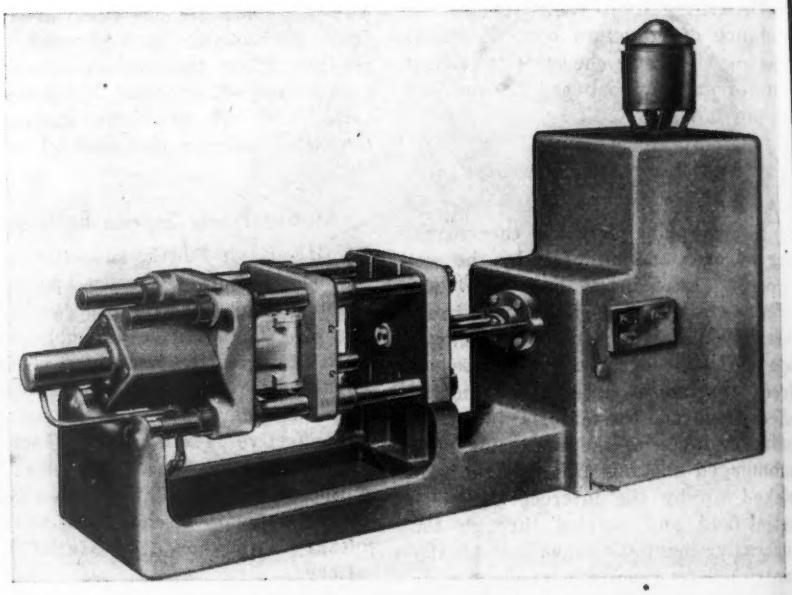


FIG. 1—The Harvill standard cold chamber die casting machine. Platens, tie bars and die adjusting nuts of extra heavy construction are utilized.

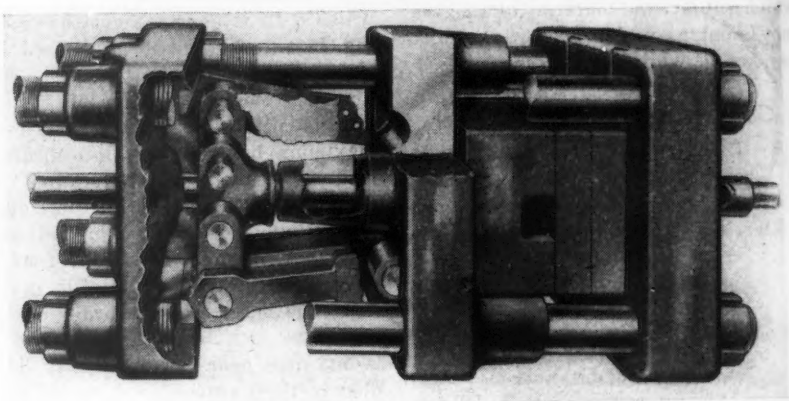


FIG. 2—Cutaway view illustrating the patented die locking toggle mechanism. Dies when closed are held by the toggle mechanism at a minimum of 500 ton pressure to withstand injection of metal.

The Harvill company includes in its die casting packages such items of standard accessory equipment as a tip-over ingot mold, aluminum or brass holding furnace, die heating torch, pyrometric control, shooting cylinder assembly, and an assortment of ladles and other tools.

Super-High-Speed Cutting of Metals

THEORETICAL considerations confirmed by experimental results indicate that the energy consumption involved in the cutting of metals is primarily made up of the energy consumed in plastic and elastic deformation, according to V. D. Kuznetsov in *Vestnik Metallopromyshlennosti*, No. 7, pp. 27-35. With increasing speeds a metal tends to behave more and more as a brittle material, with plastic deformation becoming less and less. Consequently the total energy consumption decreases.

Turning tests on steel at 4920 ft. per min. showed that little heat was generated. At 7217 ft. per min. the life of the carbide tool was practically zero, for the mild steel cylinder ground the tip away without itself suffering any change.

When machining cast iron and aluminum with a milling cutter at a peripheral speed of 5577 to 7545 ft. per min., these metals behaved like brittle materials while carbon steel and copper did not.

HARDINGE

Horizontal-Vertical Collet Index Fixture

with Threaded Nose Spindle

In addition to taking standard collets, this fixture takes step chucks and jaw chucks to cover a wide range of applications.

The purchase of this fixture will eliminate the necessity of your tool room making many specially designed fixtures. Thus, your engineers and tool-makers will have more time for other work.

A preselector arrangement provides the selection of separate indexing of any number divisible into 20 or 24.

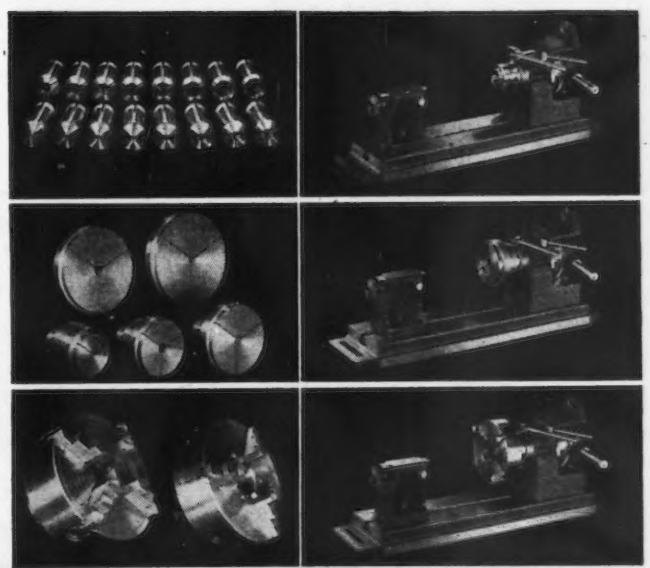
The collet closer lever has a 100 to 1 leverage for quick opening and closing of collets and step chucks.

Write for complete bulletin

1" COLLET CAPACITY: 1/16" to 1" in any fractional or decimal size. The set of collets illustrated is by 16ths only. Special shape and stop type collets are also furnished.

6" STEP CHUCK CAPACITY: 2", 3", 4", 5", and 6" Step Chucks and Closers are used with this fixture. These chucks are operated by the same lever collet closer that operates the collets. Furnished stepped to desired specifications or customer can apply required step or steps.

5" JAW CHUCK CAPACITY: Universal and Independent Jaw Chucks applied to the spindle nose have a 5" capacity. The chucks embody the Hardinge feature of integral mounting which decreases overhang and increases accuracy.



HARDINGE BROTHERS, INC.
ELMIRA, N. Y.

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

Assembly Line . . .

STANLEY H. BRAMS

• War contracts being speeded up in Detroit area under spur of the faster pace in Europe . . . Possible taxicab order is in wind before the year ends . . . Union battles over no-strike pledge.

DETROIT—This hub of armament production has an air to it these days somewhat reminiscent of early 1942. There is the same perplexity over the state of war contracts, the same rush to increase production, the same worries over manpower and materials availability, and almost the same detachment as regards civilian goods output

The Army Service Forces and the Army Air Forces have reversed their policy of placing no new war production contracts in the Detroit area. The Army Technical Forces, which has never been a dominant factor in Detroit contracts but whose work, nevertheless, has been at least a noticeable segment, has not yet begun to place new business in the district, but is considering a change in this position.

Ability of Detroit companies to take on new war jobs is currently a matter of some debate. In it the old line-up of everybody against the government is clearly evident; the War Manpower Commission continues to insist that there is a current and continuing shortage of male help, while both the Michigan Manufacturers Association and the CIO United Automobile Workers Union—strange bedfellows indeed!—devoutly claim that there is no shortage. Naturally these later parallel positions stem from opposition to a national service act, but they may be based in fact. The auto union points out, to support its claim, that employment at Willow Run has dropped from 40,000 to 20,000 in recent months, that Briggs has laid off around 12,000, and Murray more than 6000. It was the presence of figures like these, said the union, which led to the reversal of contract placement policy in Detroit on the part of the Army branches.

It is a fact that new work is coming into the area. It includes tanks and other Ordnance vehicles, and preliminary work on significant aircraft developments including new power plants which are so far away from production that there is a chance they will not see action even in the Pacific war.

Quantities on current contracts are also being stepped up; notable is the example of tanks previously published. New models of tanks are going into production at both the Detroit Tank Arsenal operated by Chrysler and the Fisher Tank Arsenal at Grand Blanc, Mich., near Flint.

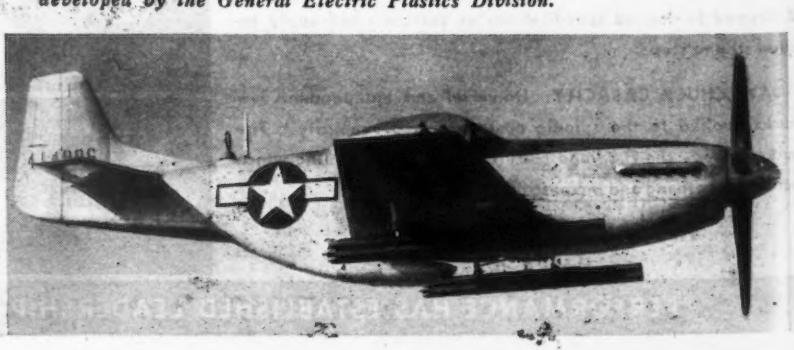
Chrysler's Dodge and Highland Park plants have built more than 150,000 rockets for use in both the Pacific and European war theaters. These 4.5 in. rocket shells, 32½ in. long, are launched from planes, tanks and ships. The Dodge division is producing the shell nose and burster tube, while Highland Park turns out the shell body and assembles fins to body and tube to shell. These are largely built with equipment used to turn out Bofors 40 mm. Army gun barrels, a recently terminated job.

THE straws in the postwar wind persist. Packard, which bobs into the news at regular intervals with bits of its future planning, took the wrappings off a new idea the other day when president George T. Christopher reported that his engineers are thinking of using a segment of the Packard marine engine for heavy trucks and construction machinery. Experimentation has developed the fact that six cylinders of the PT boat engines—simply half of the engine split at right angles to the length—turns up around 400 hp. A four-cylinder unit generates 200 hp. These engines, therefore, might work out well for installation in 10-ton trucks or other vehicles that size. Indications were that an inquiry has actually been made for these segmented powerplants for use in a few hundred snowplows for airports, where removal of snowfalls from runways is not only an important job, but a machine-straining one as well. Orders up in three-figure quantity for such units wouud not be unwelcome anywhere.

This brings to mind the fact that another company is playing with the idea of setting up a standard piston, cylinder, valve and crankshaft segment for assembly in a "V" arrangement which could be stretched out just as long as desired—with additional horsepower at each step. The use in this particular adaptation would be in aircraft, which could thereby be powered just as intensively as specifications required simply by putting another pair of cylinders onto the end.

Going back to Packard, Christopher reported that capital expenditures required to return the company to automobile manufacturing would come to around $10,000,000, practically entirely for machine tools and renova-

LICENSED TO AUSSIES: *The P-51 Mustang, designed by North American Aviation has been licensed to the Australian government for production in that country. The rocket launchers are now made from a new paper plastic developed by the General Electric Plastics Division.*



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GREENFIELD TAP AND DIE CORPORATION

TAPS. DIES. GAGES. SCREW PLATES. TWIST DRILLS. REAMERS. PIPE TOOLS

GREENFIELD, MASSACHUSETTS
UNITED STATES OF AMERICA

TO OUR CUSTOMERS:

Final arrangements for the purchase by the Greenfield Tap and Die Corporation of The Geometric Tool Company of New Haven, Connecticut, have been completed.

The acquisition of this nationally known firm of precision tool-makers will broaden the base of Greenfield's service to industry -- in research, screw thread engineering, and in the production and distribution of a complete line of precision threading tools and gages.

The Geometric Tool Company, as you may know, makes self-opening die heads, chasers, collapsing and adjustable taps, chaser grinding fixtures and threading machines. Its experience fits in ideally with our own knowledge of cutting tools and gages.

We plan to operate The Geometric Tool Company as a division of the Greenfield Tap and Die Corporation, pooling our engineering and manufacturing experience to provide better threading tools and screw thread service than ever before.

Very truly yours,

GREENFIELD TAP AND DIE CORPORATION

D. G. Millar

President

D.G.Millar-M

ARMY NAVY

GTD GREENFIELD

GREENFIELD TAP and DIE CORPORATION
Greenfield, Massachusetts

ARMY NAVY

GEO MET RIC

GEOMETRIC

THE GEOMETRIC TOOL COMPANY
New Haven, Connecticut

tion of existing tools. Some of these latter are going through the tool shop as time and facilities permit. This is rather standard practice these days in all the automotive companies; they are doing bits of repair work on long-idle machines whenever a chink of spare time opens up in the maintenance departments.

Packard has a rather legitimate reason for looking over its facilities for automotive production, even two reasons. In the first place it was admittedly the most handicapped company in the industry some months ago when talk of reconversion first became rife; its facilities were solidly blanked out by war work, and ever since then the management has been anxiously seeking spare space to juggle in order to make car-making area available. Second, it now appears that the government may decide to permit manufacture of taxicabs, possibly even earlier than general automobile output is authorized, and if such becomes the case Packard may be in on the ground floor for one of these orders—provided it can fill it.

NO Detroit panorama is complete without a word about the unions and the labor situation. The matter of most pressing interest at this time is the referendum vote among the 1,200,000 members of the United Auto Workers Union, which will probably be in the mail by the time this column is distributed, on the issue of the no-strike pledge. The results will be available sometime late in February or early in March.

The union has been shaken by the bitterest internecine dispute since the Homer Martin schism in 1938 as a result of the no-strike pledge issue. Conservatives, led by Walter Reuther, have lined up alongside the radical bloc headed by George F. Addes and Richard Frankensteen in support of the pledge; the Communists are backing them completely. Opposed to any promises to refrain from striking are the so-called "rank and file caucus" members, who derive a sort of grass roots strength direct from the shops, and who are strongest in Briggs, Ford Highland Park, the Flint General Motors plants, and others.

All the same, best informed opinion within the union is that the no-strike pledge will be upheld by the vote. No one wants to bet any money on the outcome, though, which may be another way of saying that the administrative assistants who whistle and smile with nervous assurance when they are asked about the matter are simply walking by a graveyard and are not too sure that ghosts labeled "freedom to strike" may not arise at any step, surround them, and with one mighty whoosh blow them away to a Never-Never Land where strikes are a form of business as usual, war or no war.

Jigs and Fixtures Delivery Promises Materially Extended

Detroit

• • • **Indicative of the** increased load of war production which was suddenly dumped into Detroit late in the year, tool and die shops have materially extended delivery promises on jigs and fixtures in all sizes.

A total of 136 shops listing their facilities through the tooling information service of the Automotive Council for War Production average a delivery promise of 5.20 weeks on jigs and fixtures. Three months ago, this promise averaged 4.39 weeks. During that intervening period, the average promise on gages has also gone up, from 3.10 to 3.86 weeks. Cutting tools remain available in almost all shops either from stock or on immediate production.

One factor in the length on deliveries is the lower employment total currently being manifested in the independent shops. Employment in one group of the reporting companies as of January total 9058, and this same group had 9552 on the payroll last October. Some of the smaller shops showed gains, but many of the large volume producers were shorter of help than they had been.

M48A2 Fuze Program Studied at Meeting

Chicago

• • • **Groundwork for doubling** production within six months on the highly urgent M48A2 fuze for heavy artillery shell was laid at a meeting of the Ordnance Industry Integration Committee for this fuze at French Lick, Ind., on Jan. 23-25. Over three hundred industry representatives from 135 companies located all over the United States will attend the session.

The M48A2 is the standard high explosive fuze for heavy artillery shells. Of the prime contractors attending the meeting only 30 per cent have been in production over an extended period, 40 per cent are just getting into production and the remaining 30 per cent are without previous production experience on the item.

Purpose of the meeting is to exchange production ideas and techniques so that the greatly increased schedules can be met on time. Production experts from the experienced companies are bringing assembly fixtures, jigs, cutting tools and gages to explain their use to the new manufacturers. Movies showing manufacturing operations on the fuze will be shown to the group.

VERSATILE TANK: *In a battered French town an ordnance welder prepares to join a steel plow to the front of an M4 76-mm. gun-tank for use in uprooting land mines.*

INDUSTRY'S FIRST CEMENTED CARBIDE ROTARY FILES

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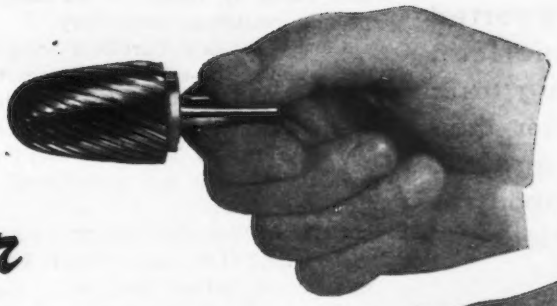

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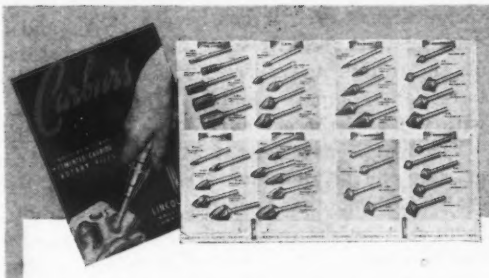
DO YOU have a particular burring or filing operation that requires an unusually large or small size Carbur . . . or one of a specially designed shape? Lincoln Park can supply it promptly for, in addition to producing twelve standard shapes—each in from four to six sizes and from fine to coarse cut—Carburs' facilities are set up to turn out Carburs in almost any shape or size to your special order.

The result of long research and development work in the grinding and forming of cemented carbides, Carburs have fully proved their ability to offer at least fifty times the tool life of steel rotary files. They retain a sharp cutting edge over a long period of time . . . because of their free cutting action, greatly reduce operator fatigue . . . can be run at much higher speeds, reducing finishing time per part materially . . . and consistently increase efficiency in rotary file use.



WRITE for your copy of Carburs booklet with illustrations, description and prices of all standard size tools. . . . It's yours for the asking.

Prices on special shapes and sizes of Carburs to meet your specific needs may be had on request. It is important that dimensions and full details of your special requirements be given us when writing.

ARMY E NAVY

LINCOLN PARK INDUSTRIES, INC.

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Washington . . .

L. W. MOFFETT

• Alleged German tank superiority reported due to an American theory of using tank destroyers rather than pitting tank against tank . . . Weapon research called adequate.

WASHINGTON — American Generals are not incompetents when it comes to tactical or technical matters. It has been a favorite pastime recently since the Battle of the Bulge to criticize guns and tanks, and compare them unfavorably with those of the enemy.

The War Department and the chiefs of staff have been hauled over the coals and blame has been heaped upon them for the great loss of American life because of superiority of German equipment. Little has been left to the imagination of mothers and fathers who can only see in the criticism the torn, seared, mangled and bloody bodies of their sons so unlucky to be caught in the mistakes of theorists and red-tape artists.

The public which is inescapably ignorant of strategic and technical matters wonders if there is not some truth in the criticisms. American reverses set the average citizen speculating about the reasons for them. Don't we have enough stuff? Is the German technical genius superior in the production of weapons? Is our supply system failing? Are German infantrymen equipped with more weapons and are they better trained? Does War Department red-tape prevent improvements on weapons from getting to the front in time to meet the lightning speed of German technicians and supply experts?

Civilian criticism of military equipment, when not backed up with technical knowledge and criticism of strategy by persons unfamiliar with latest military science and the situation faced by troops in the field is usually gratuitous tomfoolery.

German tanks and artillery are good and technical observers and researchers in Britain and America know just how good. It is inconceivable that the superior weight and armor of German tanks was not anticipated in American design.

Early in 1941, this country built an assault tank of 67 tons in weight heavily armored and equipped with a high caliber, high velocity cannon. It was then decided after actual use and experiment that a lighter tank which would be faster would be a better offensive weapon. Indeed, Gen. Patton could not have proceeded as rapidly as he did across France if the American Army had been equipped with tanks as heavy as the Germans are now using, military experts say.

Even the enemy regard Gen. Patton as the foremost exponent of tank warfare. If Gen. Patton wanted an 80-ton tank, he would only have to say so, and the War Department would have started engineers to work on such a model and it can be assumed it would have been on the battlefield long before this.

If the United States were fighting a defensive war on home soil, it is unquestionable that this country would produce heavier tanks because the limitation on railroad transportation both here and in the various theaters of war would not exist.

After it was decided to produce the 38-ton medium tank and the 18-ton light tank, shipping facilities were signed for these tanks. More troops were trained in them and e ineering equipment for invasion the crossing of rivers was speci designed for their use.

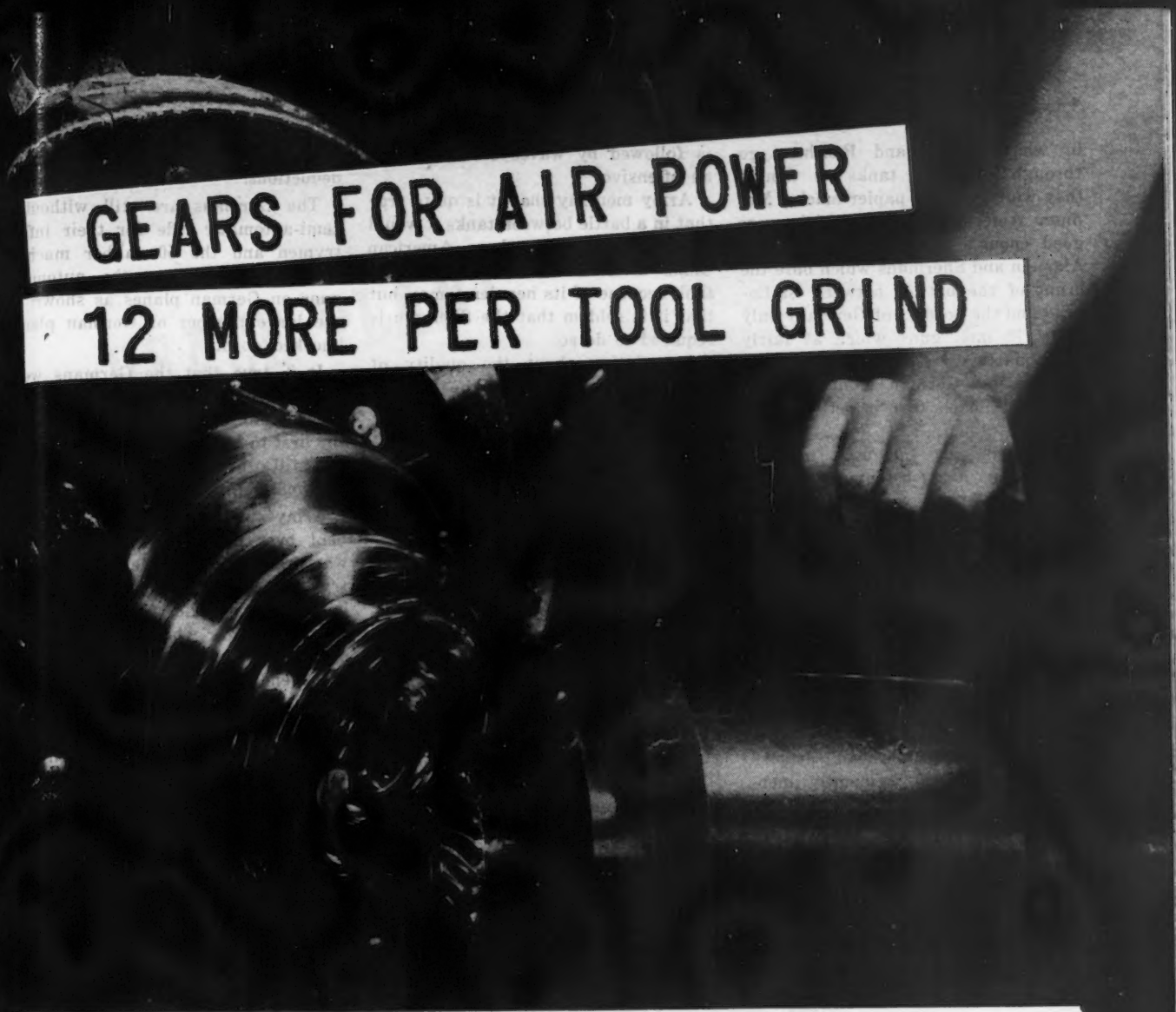
Tanks now reaching the battlefr only bear the resemblance of dis cousins to the first Shermans. T are more heavily armored and are armed with 76 mm. guns as well 105 mm. howitzers. Track flanges h been fitted to negotiate muddy rain.

The President has said that a tank is in production now armed w a cannon of higher power. This t is still a medium tank and has wi tread to cope with gumbo muds western Europe.

Latest American tanks now speed the German Panthers Tigers by seven miles an hour. W the latest German tanks have he front armor, at least 7 in. thick, wi tread, and carry an 88 mm. gun high velocity, they are clumsy and being knocked out daily by anti-t artillery (105 mm. and 155 mm.) and high-speed (55 miles an hr.) t destroyers which mount an effec 76 mm. gun of extreme accuracy striking power. The M-18 Hell lightly armored and heavily armed more than a match for any tank Germans have put into the field Europe up until now, technical servers report.

The great fallacy of arguments going around is picturing tank batt

KNOCKED OUT TIGER: *In the American drive to take Coutances, France, th Tiger tank was knocked out. U. S. Army Ordnance men inspect the tank, look ing in where the turret was knocked off.*



SUNICUT improves finish of gears... tool life increased from 8 to 20 pieces

The outstanding progress of metal working in the aviation industry may be credited to the ready adoption of new and better methods. This is especially true in cutting lubricants!

Short Tool Life and inferior finish were slowing production in a plant machining airplane gears. Several well-known cutting lubricants were used up to seven months ago. Then a Sun Cutting Oil Engineer stepped in, studied operating conditions and recommended Sunicut.

Output increased 150% per tool grind. With Sunicut they increased tool life from a previous average of 8 pieces per tool grind to 20 pieces. Results . . . longer tool life . . . improved quality of finish . . . less time lost for tool resetting.

Experiences of operators of machine tools prove the production value of Sunicut — developed to make tools hold their edges longer, cut faster and produce better finishes. Put this transparent, free-flowing, sulphurized cutting lubricant to work in your shop. Write for details to . . .

SUN OIL COMPANY • *Philadelphia 3, Pa.*

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OILS FOR AMERICAN INDUSTRY

in which Tigers and Panthers go through American tanks as though they were made of papier-mache. Medium American Grants which were good enough to stop Rommel at El Alamein and Shermans which bore the brunt of the battles between Stalingrad and the borders of Germany only carry 75 mm. guns which at fairly close quarters are capable of piercing the heaviest German frontal armor. Improved models turn in better showings.

But tanks are not built to fight tanks. This is a job for anti-tank infantry, anti-tank artillery and the Hellcats. Whenever possible both American and enemy tanks avoid each other in battle, because the role of a tank in modern warfare is not to fight other tanks, but to act as mechanized cavalry—for use against enemy infantry, to destroy communications, fuel and ammunition dumps after our infantry has opened up a hole in enemy lines, the tacticians say.

Tanks do not "spearhead" attacks consequently as is frequently mentioned in front-line dispatches. Tanks leap to the attack after a way has been prepared by artillery and infantry. The tankman's role is mopping up most dangerous points of resistance, while protected by armor, and is followed by waves of infantry in an offensive.

Army men say that it is quite true that in a battle between tanks it would likely take two or three American tanks to down a new-type German tank because of its heavier armor, but that it is seldom that the Sherman is required to do so.

Speculation about the quality of guns and ammunition on the fighting front is almost as foolish as wondering whether the War Department will ask Congress for many billions of dollars the next time it gets a chance.

A new universal fuze which is adaptable to guns from 75 mm. up to 155 mm. is knocking over concrete pill boxes with regularity and ease. One technical observer reports that a direct hit with a 155 mm. on a pillbox at one mile ripped open the fortification and killed all of its defenders. The reinforced concrete was only 7 ft. thick! Captured Germans later wanted to know if the Americans were using a secret weapon.

The Army maintains extensive proving grounds and war contractors have literally built experimental laboratories from Maine to California with a prodigality of money spent for equipment and personnel which will astonish the Bureau of Internal Revenue when it gets around to looking at tax deductions.

The Germans are still without a semi-automatic rifle for their infantrymen and the 50 caliber machine guns which outclass the automatic guns on German planes as shown by the large number of German planes knocked down.

It is true that the Germans were the first to make extensive use of the robot bomb but American troops were the first to be equipped with Bazookas and still other rocket weapons are yet to come from the American arsenal.

Army procurement officers have bent over backwards to get all the war production possible out of industry and for three years have been building up supplies for the land portion of the war which is only a little over seven months old. With the idea of expending materials to save lives, the War Department has spent close to $200,000,000,000 in this time.

On the question of distribution and supply the best heavy industry experts have advised the Army and the feat of merely moving more than 2,000,000 men and their equipment over the invasion beachheads of Europe has no equal in the annals of history. It was like building the whole city of Boston in a few months. Men without know-how couldn't have accomplished this in the face of most stubborn enemy resistance.

On the other hand mistakes have been made. Tires and 100 octane gasoline were two such mistakes. No one could possibly conceive the need for these two items which have developed over the months, so that when estimates were made they were too low. Both shortages are being remedied now.

Contrary to popular belief, soldiers are not elbow to elbow along a battle line. The fact is that one might go to the line and not find a single soldier around. They are posted in strategic concentrations.

When the enemy plows forward in force at a weak point, it is not for some time until reinforcements can be brought to bear to push back the bulge. During all the time the enemy was moving forward, American troops salvaged much equipment before a defensive line was stabilized.

Counting casualties and damage to enemy equipment, the real belief in the War Department today is that we have won the Battle of the Bulge because enemy losses were twice what ours were.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

WELL, HIGHPOCKETS, I SEE BY THIS REPAIR ORDER YOU'VE WRECKED TH' WORKS! WHAT DID YOU DO, FALL ASLEEP ER HAVE YOUR MIND ON A GROCERY LIST?
HIGHPOCKETS! WHAT DO YOU MEAN, HIGH-POCKETS? DON'T YOU START ANY OF THAT FUNNY STUFF WITH ME, SHRIMP!
YOU CAN MAKE MACHINISTS, AVIATORS, AN' MOST ANYTHING ELSE OF 'EM, BUT YOU CAN'T EVER MAKE FUN OF 'EM!
'AT'S ONE REASON, IN SPITE OF PANTS, CIGARETS, AN' EVERYTHING ELSE, THEY'LL NEVER BE QUITE LIKE MEN-- THEY WON'T STAND FER NICKNAMES!
J.R.WILLIAMS
A DELICATE SUBJECT
T. M. REG. U. S. PAT. OFF. COPR. 1945 BY NEA SERVICE, INC.
1-26

Our sons are fighting to free the world from ignorance, intolerance and want . . .

. . While some 6,000,000 of our people are wholly illiterate, and the majority of Americans have less than a completed high school education.

. . While there were more than 3,000 strikes during the past year, some of the bloodiest of which were based upon race intolerance.

. . While more than one-third of this nation's dwelling units are still without flush toilets or any bathing facilities whatever. Ignorance, intolerance and want!

America will soon have the chance to help write a peace plan for the rest of the world — and that plan can begin here at home. For our country's greatest immediate contribution to world reconstruction and peace would be to make ourselves lastingly strong, with jobs enough for all.

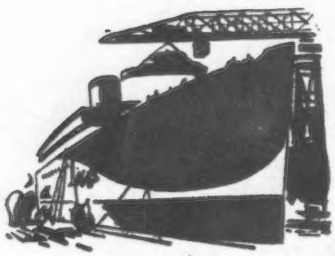
Today, the engineers of the machine tool industry can greatly help the men of government and of industry to write that plan . . . to prepare now for the reconversion of our tremendous wealth of resources, skills and machinery to all-out production for a better America! One of these engineers is a Bryant man, and we invite you to call upon him now.

BRYANT CHUCKING GRINDER COMPANY SPRINGFIELD VERMONT, U.S.A.

West Coast . . .

OSGOOD MURDOCK

• C.I.O. girds for political action in California . . . Opening membership drive . . . Additional San Francisco airport contemplated.



SAN FRANCISCO—With a bargain invitation to 80,000 members the California CIO executive board hopes to raise $73,370 for the Political Action Committee in 1945. At the annual board meeting Sidney Hillman gave his first speech to any unit CIO's political action group since the election. His speech underscored the necessity for full immediate cash support of the political program.

Mr. Hillman set forth again the belief that American labor, under responsible leadership would lead the postwar democracy to full employment. He stated that the confidence and prestige already developed should continue, and that the nation should center its attention on winning the war and achieving a lasting peace, to be accompanied by full production and employment. Emphasizing the need for unity, he pointed out that the CIO is obligated to carry the fight against discrimination. He indicated that solidifying the potential power could be done only through political action.

Apparently the California membership of the organization is in the neighborhood of 75,000, for the state weekly *Labor Herald's* reported circulation is 78,000, a 20 per cent increase in the year. The publication has been referred to by state secretary Mervyn Rathbone as "One of the most remarkable in the United States." He continues that no state council in the country has a newspaper as large or effective.

The CIO state that the objectives for the year include the compulsory health insurance plan presented to the State legislature in session, an appeal to Roosevelt, and Biddle to dismiss deportation order on Harry Bridges, creation of a permanent state fair labor practices commission, law to penalize violators, opposition to labor draft law, the fostering of labor, management, and government cooperation "to eliminate causes of labor shortage" as a substitution for the draft, and the recruitment of membership, especially among state, county, and municipal workers.

The CIO Health Insurance Plan embraces all workers covered by unemployment insurance, comprising 2,300,000 workers, who with their families total 5,900,000. The recommendation is that each earner have an extra one and one-half per cent of his earnings deducted with the unemployment insurance, and the employed pay a like sum. Administrative costs are to be borne by the state. Under the plan individual families are entitled to medical care, by a doctor of their choice, hospitalization, and surgery. Doctors would be paid an amount for each patient treated. The administration would be by a nine man commission, consisting of two representatives of labor, two of employers, two physicians, two farmers, and one public members.

Governor Warren recommended practically the same program to the legislature except that the doctors would be paid a fee, rather than on a capitation basis.

On the basis of statistics in the latest report of the California division of labor statistics law enforcement there are 768,000 wage earners in manufacturing industries. California's CIO membership is less than 10 per cent of the total industrial workers.

The new west coast regional director of the CIO United Auto and Aircraft Workers is Cyril V. O'Halloran, who succeeds Lew H. Michener, who failed of re-election at the UAW national convention. The union includes many aircraft workers, and southern California is the key location. Workers are torn by factionalism and disunity in both organizations.

The fact that the aircraft wage scale in the area is lower than that for shipbuilding causes agitation. In a statement made last week O'Halloran urged members to vote to retain the no-strike pledge in the international union referendum on the pledge now under way. Fellow unionists feel that O'Halloran is tending toward the Thomas faction, rather than to the Ruether group in the national union, and look to him to strengthen "serious weaknesses in organization" in North American and Douglas' Long Beach plants.

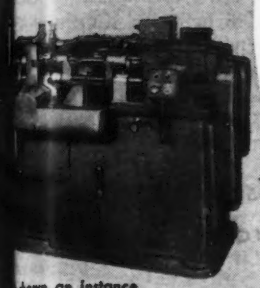
* * *

Plans for a Western States Council, Chamber of Commerce, have been arranged regionally, so that only 50 representatives will gather. It is contemplated that each locality will be represented by a man from each interest. Spokesmen will represent respective industries, with delegates presenting

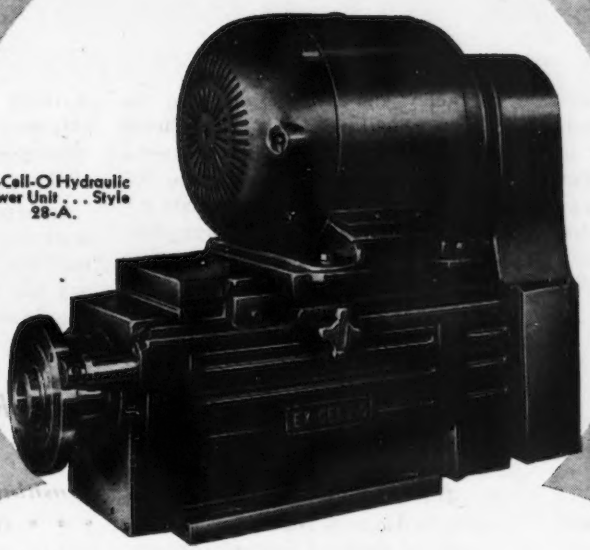
JET PROPELLED 'COPTER: *Propelled forward by a jet in the tail, torque corrected by a second jet located at right angles to the first, this is the first such craft to be publicly described. Developed by Antoine Gazda, credited with the development of the Oerlikon A. A. gun, it is reported that flight tests are under way.*

XLO

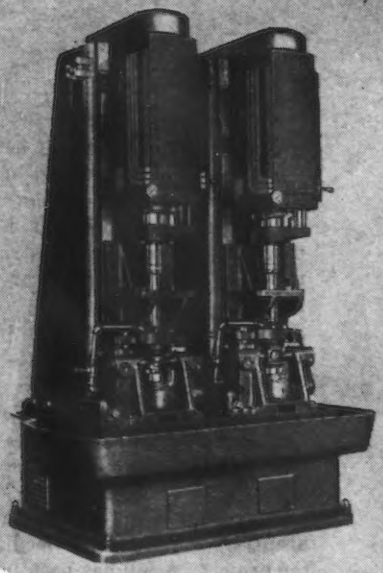
...LL-O *for* PRECISION



...shown an instance ...e Ex-Cell-O Small ...c Unit (Style 21) is ...s machine for the ...drilling of holes in ...pump bodies.



Ex-Cell-O Hydraulic Power Unit . . . Style 28-A.



On this Ex-Cell-O double drill press, two Style 25-A Ex-Cell-O Hydraulic Units are mounted on the columns in vertical position. This has definite advantages on certain classes of work.

Design for ECONOMICAL PRODUCTION!

Production Machines equipped with Ex-Cell-O Hydraulic Units have numerous advantages

For the machine you build, or the machine we build, the use of Ex-Cell-O Hydraulic Power Units provides these features:

They are compact, for proper design.
They are self-contained, for ease in installation.
They have infinite feeds, for proper cutting.
They have gear change, for proper speeds.
They have ample power, for multiple-head operation.
They have variable stroke, for greater flexibility.

Ex-Cell-O Hydraulic Power Units are standard and produced in quantities, but in nearly every case where the unit is used it becomes a part of a special, high production type machine for a specific operation. These units are economical because, as applications change, the units can become a part of the new machine even though entire base is redesigned.

The units can be mounted on any plane—horizontally, vertically, or angularly—on a temporary or a permanent base, and they can be arranged so that it is possible to use them in connection with guide bars and multiple drill heads.

Find out today how Ex-Cell-O Special Machines and Ex-Cell-O Hydraulic Power Units can fit your program for today's and tomorrow's production.

Where high production, accuracy, and economy through multiple operations are required—consult EX-CELL-O now

EX-CELL-O CORPORATION

DETROIT 6, MICHIGAN

SPECIAL MULTIPLE WAY-TYPE PRECISION BORING MACHINES • SPECIAL MULTIPLE PRECISION DRILLING MACHINES • PRECISION THREAD GRINDING, BORING AND LAPPING MACHINES • BROACHES AND BROACH SHARPENING MACHINES • HYDRAULIC POWER UNITS • GRINDING SPINDLES • DRILL JIG BUSHINGS • CONTINENTAL CUTTING TOOLS • TOOL GRINDERS • FUEL INJECTION EQUIPMENT • R. R. PINS AND BUSHINGS PURE-PAK PAPER MILK BOTTLE MACHINES • AIRCRAFT AND MISCELLANEOUS PRECISION PARTS

prepared reports. It will be the first truly regional gathering of western men of industry and finance, set up to arrive at an impartial determination of the facts. Industrial secretaries of the chambers of the Los Angeles, San Francisco, Portland, Seattle, Spokane, and Salt Lake City are arranging the delegates.

* * *

A third commercial airport in the San Francisco Bay area is likely if moves for a Golden Gate International Airport keep progressing. The CAA has recommended that Congress appropriate $11,514,000 immediately for the project. A bill has been introduced to the California legislature to create a joint airport district, and appropriate $5,000,000 for approaches.

Berkeley and Albany advocate the project which calls for 1400 acres of dredged filled tidelands between Berkeley and Richmond, surfacing 265 acres of runways, including 15,000 ft., 10,000 ft. and 12,000 ft. runways. The completed cost is estimated at $20,000,000 plus an additional $32,000,000 for adjacent industrial and traffic developments. The airport would be seven airline miles from San Francisco and twelve miles by express highway to the Golden Gate bridge. The airline distance to Oakland airport is 12½ miles, and to San Francisco Mills Field 17 miles, while it is 17 miles to Alameda Naval Air Station. It would be situated conveniently for water and land flights with good access by rail and highway.

Lewis Stays Quiet On Mine Workers' Demands This Year

Washington

• • • UMW President John L. Lewis had not commented by last Tuesday upon the action taken by steel leaders in their industry advisory committee meeting on Jan. 18 in asking that UMW demands be resolved prior to the union's contract expiration date March 3 and it is believed that Mr. Lewis will not comment.

Labor sources say that Mr. Lewis will ask for a direct increase in wages which will put the Little Steel Formula more in the shade than it already is. Officials of the Department of Labor do not expect UMW to take action before the contract expiration date because the committees which elect members of the policy controlling scale committee which formulates demands do not elect until the latter part of February.

The preliminary demands presented by the UMW scale committee during their convention were:

1. Continuation of industry-wide bargaining.

2. Narrowing of geographical conditions of employment at district levels.

3. Elimination of all geographical discriminatory tonnage or day wage differentials and inequities on mechanical units and all work classifications.

4. Job protection for returning veterans.

5. Fringe demands such as (a) all explosives, cables, detonators, batteries, fuzes and accessories used in blasting to be furnished by the employers without charge to the mine workers, (b) to limit the number of supervisory and technical employees exempted in the wage agreement and provide for proper classification in wage schedules, (c) employers to agree to furnish union-made tools, (d) that it will not be a violation of the wage agreement for the mine workers to cease work to prevent shipment of coal to a consumer whose employees are engaged in a legal strike.

6. After the war, limitation of the work week to 35 hr. with time and a half for overtime, including regular pay for travel time consumed in going from portal to portal.

Cited for Awards

• • • The following companies have received Army-Navy "E" awards for outstanding war production:

Adam Black & Sons, Inc., Jersey City, N. J.
American Stove Co., George M. Clark & Co. Division, Harvey, Ill.
Cambridge Rubber Co., Cambridge, Mass.
Capital Machine & Welding Works, Sacramento, Cal.
W. R. Case & Sons Cutlery Co., Bradford, Pa.
Caterpillar Tractor Co., San Leandro, Cal.
Chrysler Corp., Amplex Division, Detroit.
Connors Steel Co., Birmingham, Ala.
Durasteel Co., Lindell Plant, Hannibal, Mo.
General Motors Corp., Fisher Body Detroit Division, Ternstedt Mfg. Division, Main Plant, Division No. 3 and Plant No. 16, Detroit.
Hansen Machine Works, Sacramento, Cal.
Haynes Stellite Co., Kokomo, Ind.
Frank Holton & Co., Elkhorn, Wis.
Jamestown Metal Equipment Co., Inc., Main Plant and Blackstone Plant, Jamestown, N. Y.
Kohler Co., Kohler, Wis.
Karl Lieberknecht, Inc., Laureldale, Pa.
Max Lowenthal & Sons, Rochester, N. Y.
McGlynn, Hays & Co., Belleville, N. J.
Robert McNairn Machine Works, Sacramento, Cal.
Marathon Battery Co., Wausau, Wis.
Michigan Power Shovel Co., Benton Harbor Plant, Benton Harbor, Mich.
Miller Brothers Co., Johnson City, Tenn.
John T. Lyman Co., Inc., Montclair, N. J.
Ross Carrier Co., Benton Harbor, Mich.
Sparks-Withington Co., Plants 1, 2, 3, 4 and 5, Jackson, Mich.
Twin Harbors Lumber Co., Bingen-White Salmon, Wash.

OPA Revises Export Orders for Canada

Washington

• • • OPA has announced that effective Jan. 27, specific export premiums that can be added to domestic ceiling prices on chrome ore and concentrates, now $6 a gross ton, and on iron and steel products, now from 6 to 16 per cent, will not be allowed on shipments to Canada.

On shipment of these commodities to Canada, sellers are permitted, under another provision of the export price regulation, to add export premiums not in excess of 125 per cent of the average premiums charged in the trade during the period July 1 to Dec. 31, 1940, or from March 1 to April 15, 1942, whichever is lower.

OPA said that by allowance of the specific export premiums on shipments to Canada, exporters have been able to secure higher prices than on domestic shipments even though they sold to Canada at domestic prices before the war. This has tended to disturb the domestic market, particularly with respect to textiles, and has led to protests from domestic consumers, public officials and WPB. The specific export premiums may continue to be added on shipments to all other foreign countries.

Makes Large Recapping Machine

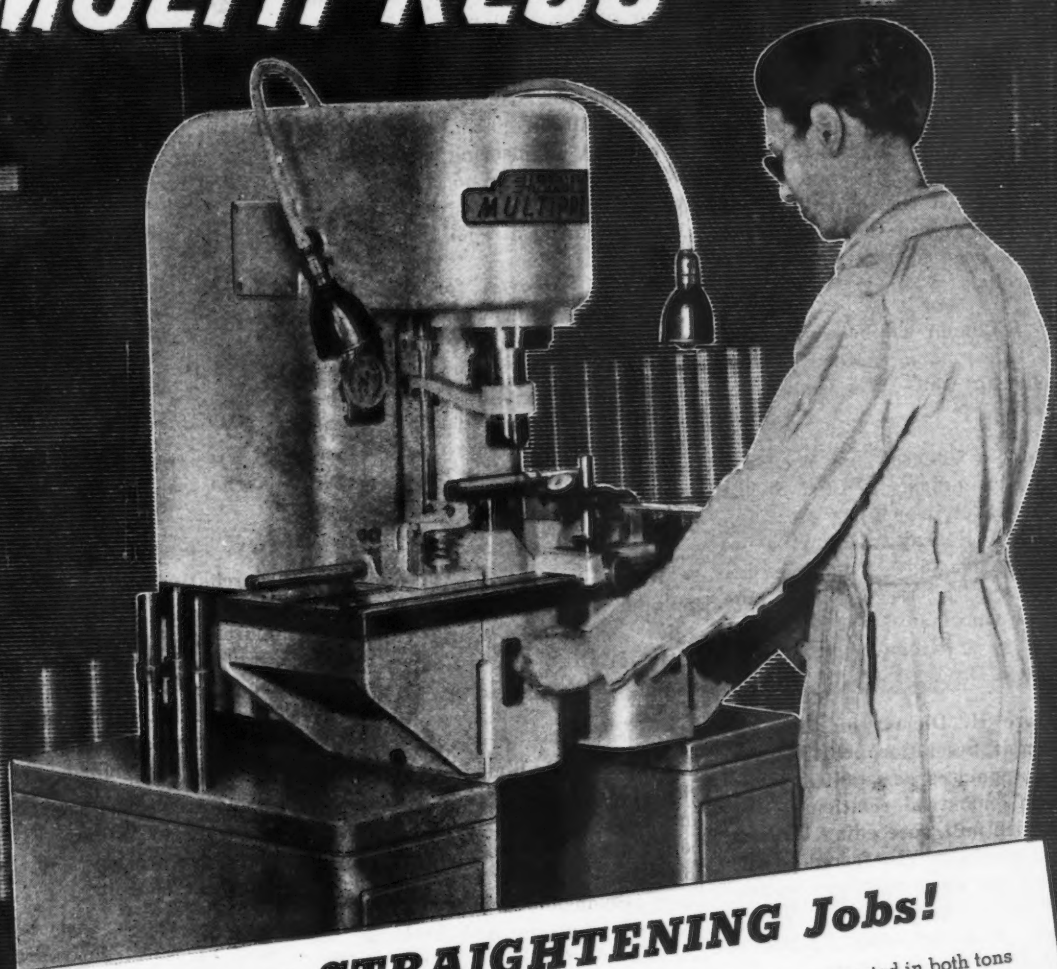
Cleveland

• • • Perhaps the biggest machine in the world for recapping tires, three times the size of any other mold and weighing 11,000 lb., has just been completed here by the James H. Heintz & Co., makers of vulcanizing and other rubber production service equipment for 26 years.

Made for the Zook Tire Co., Denver, Colo., this machine is to be used to recap tires for earth-moving equipment, which requires huge tires over five feet in diameter and weighing 600 lb.

Industry's New Tool of Multiple Uses

MULTIPRESS



—for Your STRAIGHTENING Jobs!

★ Industry's versatile newcomer—MULTIPRESS—equipped with its standard straightening fixtures, can handle any straightening task within its 4-ton pressure range with speed and precision.

Its ram responds instantly to the slightest movement of the control levers . . . may be brought down rapidly or slowly . . . can be stopped anywhere in its downward travel and the work positioned accurately beneath it. Full pressure may be applied at once or increased gradually. Ram pressure limits may be easily and quickly pre-set anywhere between 300 and 8,000 pounds. Ram travel may be limited anywhere between 1/16-inch and 6 inches.

Spring mounted gauging rolls, or gauging centers, disengage the work from the V-blocks for easy checking. The precision gauge on the straightening fixture checks shaft deflection, while the gauge in the throat of MULTIPRESS shows pressures exerted in both tons and pounds per square inch. Straightening tools screw into the internally threaded ram, and are available in radius, inverted radius, and flat styles. Adjustable lights—another MULTIPRESS accessory —afford light, without glare, on the exact work area.

Straightening is just *one* example of the amazingly wide range of production operations to which the basic MULTIPRESS (as shown below) can be quickly adapted. Other accessories include Motor-driven Indexing Tables, Automatic Cycling Action, Vibratory HydrOILic Pressure Ram Action, and others. Only 16 inches wide, 26 inches deep, and 34 inches high, the unit is a completely self-contained, motor-driven, oil-hydraulic machine tool . . . delivered ready to go to work after electrical connections have been made. Write for details!

The Denison Engineering Co., 1158 Dublin Rd., Columbus 16, Ohio

DENISON
EQUIPMENT for APPLIED
HydrOILics

PERSONALS

• **Glen McDowell** has been appointed assistant to the vice-president of the Aetna - Standard Engineering Co., Youngstown, Ohio. Mr. McDowell has been employed by Aetna-Standard since 1925, serving in the Engineering, Estimating and Roll Sales Departments.

• **Rae F. Bell,** former first vice-president of the A. O. Smith Corp., Milwaukee has been elected chairman of the firm's board of directors to succeed the late L. R. Smith. **Anthony von Wening,** who joined the organization in 1940, has been elected vice-president and controller.

• **W. S. O'Connor** has been appointed district sales manager for the New York office of the U. S. Gauge Co., New York.

• **Charles H. Johnson** has been appointed chief engineer of U. S. Steel's Federal Shipbuilding & Dry Dock Co. shipyards at Kearny and Port Newark, N. J. Mr. Johnson assumes his new duties after a year and nine months as coordinator of engineering for the U. S. Maritime Commission in Washington, D. C.

• **Theodore H. Diemer** of the Carnegie-Illinois Steel Corp., Pittsburgh, has been appointed assistant superintendent of industrial relations, Gary sheet and tin mill, succeeding **William P. Jones,** recently transferred to the Pittsburgh industrial relations department of the company. Mr. Diemer has been associated with Carnegie-Illinois for the past nine years.

THEODORE H. DIEMER, assistant superintendent of industrial relations, Gary sheet and tin mill, Carnegie-Illinois Steel Corp.

• **Kenneth W. Huffine,** former manager of the Waukegan, Ill., plant of Johns-Manville Corp., New York, has been elected vice-president of the corporation. Mr. Huffine in his new capacity will be in charge of a newly organized engineering department at New York, created to consolidate engineering activities in the mining and manufacturing division.

• **N. M. Salkover,** for the past 20 years vice-president and general manager of the Queen City Steel Treating Co., and also vice-president of the Cincinnati Mine Machinery Co., both of Cincinnati, has sold his interests in those corporations in order to devote his entire time to Salkover Metal Processing, a company which he organized in 1941.

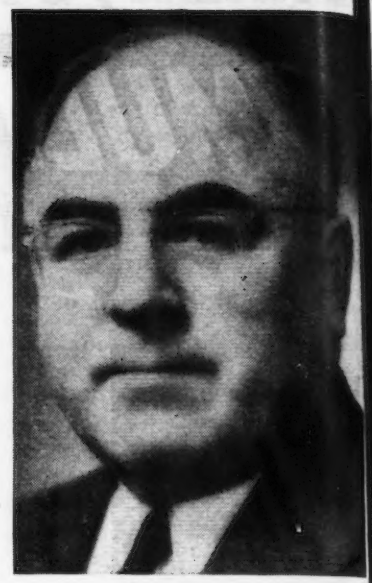
• **Walter W. Bertram** has been appointed vice-president in charge of sales and **Robert J. Howison,** sales manager of the Morse Chain Co., division of the Borg-Warner Corp., Ithaca. N. Y.

• **Dr. Martin de Simo** has been elected vice-president in charge of research and development, Great Lakes Carbon Corp., Chicago. Dr. de Simo joined the company in 1941 and has been responsible for organizing the research division and building the company's central laboratories at Morton Grove, Ill.

• **E. L. Feininger** and **William H. Milton, Jr.** have been made assistant general managers of a newly created chemical department of the General Electric Co., Schenectady. Mr. Milton will be located at Pittsfield, the headquarters of the new department, and Mr. Feininger will make his headquarters in Schenectady.

• **Wesley L. Wilson** has been appointed commercial manager, Quartz Crystal Division of North American Philips Company, Inc., Dobbs Ferry, N. Y. Mr. Wilson has been purchasing agent for the company since 1942.

• **George C. Ford** has been named works manager of Vultee Aircraft Corp.'s Vultee Field Division at Downey, Calif. For the past year and a half Mr. Ford has been director of industrial relations at the Downey plant. In his new position he will have direct responsibility for all production at the plant.



A. P. HASCALL, director of purchases, Chrysler Corp.

• **A. P. Hascall,** formerly general purchasing agent of Chrysler Corp., Detroit, has been named director of purchases. **Joseph Pfeiffer,** formerly staff assistant supervisor of the purchasing department, succeeds Mr. Hascall. **E. L. Reason,** assistant general purchasing agent for the past 20 years, has resigned.

• **A. A. Tackus** has been appointed assistant to William F. Wise, executive vice-president of the Aviation Corp., at Detroit.

• **J. A. Voelker,** former general manager of sales, Pittsburgh Steel Co., Pittsburgh, has been appointed vice-president and general manager of sales for the firm.

• **Paul J. Carlsen** has been appointed vice-president in charge of manufacturing, American Container Corp., Rock Island, Ill., a National Battery Co. subsidiary.

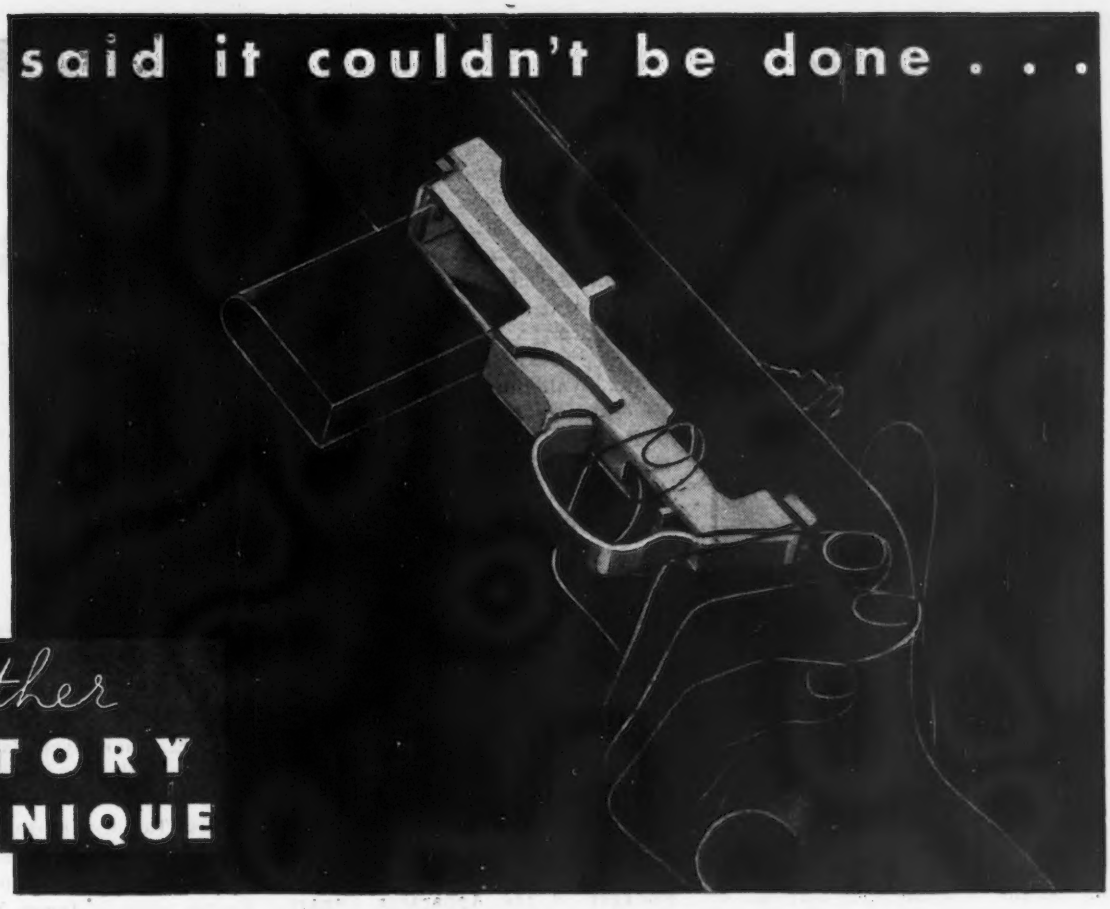
• **Norman C. Hurd** has been appointed acting manager of the Cincinnati Manufacturing and Repair Department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Mr. Hurd has been superintendent of the Cincinnati department since 1943.

• **John D. Kershaw, Jr.,** of the Hanson-Van Winkle-Munning Co., Matawan, N. J., has been appointed field engineer with headquarters in Detroit.

• **Stanley D. Whiteside** has been named district engineer for the Michigan area of the W. S. Rockwell Co., New York.

• **A. R. Stargardter** has been appointed chief metallurgist of the Ajax Electric Co., Inc., Philadelphia.

They said it couldn't be done . . .



another
VICTORY TECHNIQUE

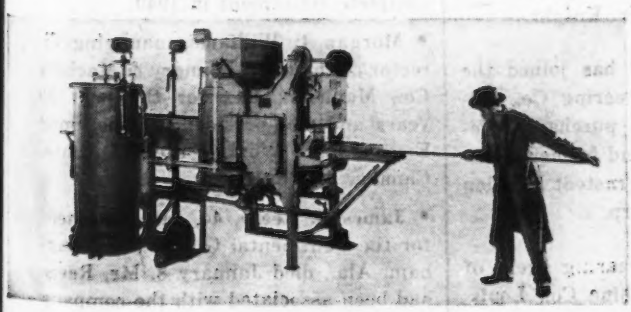
BUT 2,000,000 CARBINES NEEDED THIS TRIGGER GUARD

With machine tool builders two years behind on orders, it must be a forging, they said, machined to close tolerances.

What a laugh! But it challenged the best brains in America and out of the grave wartime extremity this trigger guard was redesigned to be punched from cold rolled strip. Its 13 pieces were copper brazed in an atmosphere furnace after cold coining and shaving to exact size. And 97 milling machines, 16 broaching machines and 21 profilers were not needed and went on producing other vital ordnance.

Besides the 720,000 machine hours that were saved, 635 less tons of steel were required, and *the cost was cut from $6.50 to $1.05 each.*

Such Victory Techniques in manufacture, production lines, metallurgy and assembly can be vital to you in peace-time operation. You must know them to compete. Ask your Lindberg representative about the new developments in brazing, in powder metallurgy, in the treatment of metals by heat in any form. He is eager to do his share to aid you in learning these vital Victory Techniques.



Lindberg Brazing Furnace

LINDBERG ENGINEERING COMPANY
2452 WEST HUBBARD STREET, CHICAGO 12, ILLINOIS.

ARMY E NAVY

Lindberg FURNACES

SUPER-CYCLONE for hardening, normalizing, annealing, tempering
CYCLONE for accurate, low-cost tempering and nitriding
HYDRYZING for scale-free and decarb-free hardening

C. A. WOODLEY, assistant general factory manager, Caterpillar Tractor Co.

• C. A. Woodley has been appointed assistant general factory manager of Caterpillar Tractor Co., Peoria, Ill. He is succeeded as factory manager at Peoria by William Naumann, formerly assistant factory manager. Mr. Woodley became machine shop foreman of the company in 1930, and subsequently superintendent of industrial engines, assistant factory manager, and factory manager.

• S. Livingston Mather, vice-president of the Cleveland-Cliffs Iron Co., Cleveland, has been placed in charge of mining operations, replacing vice-president Max H. Barber, who has retired after 41 years' service with the firm. A. E. R. Schneider, marine manager, who has served the Cleveland company for 42 years, has retired to operate his own Great Lakes vessel line. Harold L. Gobeille has become manager of marine traffic and Captain Carl O. Rydholm, marine superintendent.

• E. P. Harter has been appointed sales manager for western New York State, Universal-Cyclops Steel Corp., Bridgeville, Pa.; R. A. B. Williams has been appointed Pacific Coast representative; W. D. Fisher, special representative in Detroit; and Richard H. Dexter, sales representative in Rhode Island.

• Houston B. Watson has been appointed apparatus and supply manager of the Southwestern district, Westinghouse Electric Supply Co., New York. Mr. Watson succeeds W. G. Sterett, who recently resigned. Charles R. Matthews has been named manager of the Northern California district, succeeding E. J. Duggan, resigned.

• Alexander Dawson has resigned as vice-president and general manager of the Toronto Iron Works Ltd., Toronto, but will remain a director of the company. Mr. Dawson is succeeded by T. F. Rahilly, who has also been elected to the board of directors. For the past year Mr. Rahilly has been adviser to the Steel Controller of Canada, and formerly was vice-president and general manager of the Algoma Steel Corp.

• J. J. Wallbillich has been appointed general factory manager of Fisher Body, Detroit, fabricating plants. During the war Mr. Wallbillich has been director of the ordnance specialties and machine section of Fisher Body. He succeeds Delmar S. Harder, resigned.

• E. D. Spicer, formerly the vice-president responsible for apparatus manufacturing, the General Electric Co., Schenectady, has become a member of the president's staff with headquarters in New York. Mr. Spicer will be in charge of employee relations and will also be consultant on general manufacturing matters; Roy C. Muir has been appointed general manager of the Apparatus Department; Earl O. Shreve has become a member of the president's staff in charge of the company's customer relations and William R. Burrows, a vice-president of the company since 1927 and chairman of the labor relations committee, has retired.

• Charles C. Bray has been appointed assistant to the manager of the Worm Gear Division, De Laval Steam Turbine Co., Trenton, N. J. Prior to his present position Mr. Gray served as a metallurgist for the Special Steel Department of the Philadelphia office of Joseph T. Ryerson & Sons.

• C. V. Coons has been made assistant director of sales of both the appliance and the container divisions, Rheem Mfg. Co., New York. George W. Knight succeeds Mr. Coons as manager of the eastern container division and E. W. Manstrom has been named assistant to Mr. Knight.

• Ralph D. Haviland has joined the Snyder Tool & Engineering Co., Detroit, as head of the purchasing department. Mr. Haviland formerly was associated with the Ternstedt Division of General Motors Corp.

• S. M. Nuttall, purchasing agent of the Henry Vogt Machine Co., Louisville, has retired.

L. E. MacFADYEN, works manager, High Bridge, N. J., and Easton, Pa., plants, Taylor-Wharton Iron & Steel Co.

• L. E. MacFadyen has been named works manager in charge of both the High Bridge, N. J., and Easton, Pa., plants, Taylor-Wharton Iron & Steel Co., Easton, Pa. Succeeding Mr. MacFadyen as superintendent of the Easton plant is James M. Sandt, who was formerly assistant superintendent.

OBITUARY...

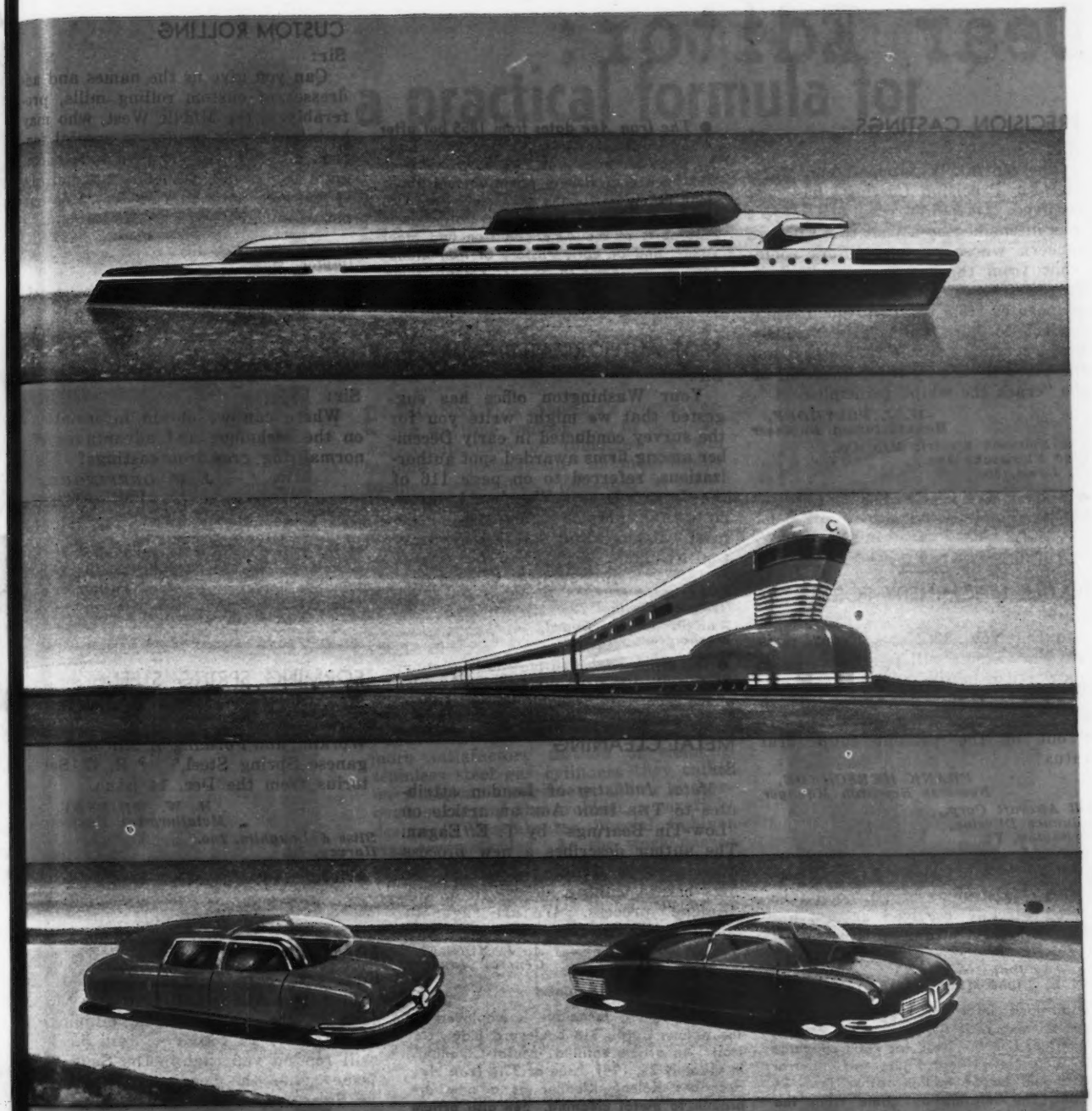
• Thompson W. Kirby, president of A. T. Wagner Co., Detroit, died January 7, after several months' illness. Mr. Kirby joined the company in 1925 as sales manager, and after Mr. Wagner's death became president.

• A. P. Steiner, formerly chief engineer and superintendent of the Landis Tool Co., Waynesboro, Pa., died January 8. Mr. Steiner joined the company in 1899 and had been connected with it continuously since that time.

• Charles W. Appleton, 70, retired vice-president of the General Electric Co., Schenectady, died January 10, after an illness which necessitated his complete retirement in 1940.

• Morgan T. Williams, managing director of the Bond Foundry & Machine Co., Manheim, Pa., for the past 39 years and vice-president of the Bond Engineering Works, Ltd., Toronto, Canada, died recently.

• James S. Reece, 44, sales engineer for the Continental Gin Co., Birmingham, Ala., died January 8. Mr. Reece had been associated with the company since 1923.



LET'S LOOK AHEAD!

Great developments are just ahead for the more extensive use of aluminum and magnesium alloys throughout all industry. Applications developed in the course of our production for war have shown that great economy in weight is possible through use of these alloys. Reduction in weight usually means reduction in operating costs, and in every phase of transportation this is a consideration of first importance. The Bohn organization is one of the country's most important sources for aluminum and magnesium alloys. Bohn specialists will be glad to consult with you on the advantages of these light alloys.

BUY WAR BONDS

BOHN ALUMINUM AND BRASS CORPORATION

GENERAL OFFICES—LAFAYETTE BUILDING • DETROIT 26, MICHIGAN

Designers and Fabricators

ALUMINUM • MAGNESIUM • BRASS • AIRCRAFT-TYPE BEARINGS

BOHN

Dear Editor:

PRECISION CASTINGS

Sir:

The reprint "Equipment and Material for **Precision Casting**" has been received. Our interest in this subject was intensified by a visit to a Chicago concern whose process differs somewhat from the lost wax method in that they use a styrene plastic which evaporates from the investment while subject to high temperature. They use a ceramic for the refractory and the piece is cast by a modification of the "crack the whip" principle.

W. J. POTTHOFF,
Manufacturing Engineer
The Emerson Electric Mfg. Co.,
8100 Florissant Ave.,
St. Louis, Mo.

● **Several companies making supercharger and jet aircraft motors employ with great success the method described above by W. T. Potthoff.—Ed.**

TEXTILE MACHINERY FOR EGYPT

Sir:

In the Nov. 30 News Front, it is said that Egypt will purchase $4 billion worth of textile machinery. Would you kindly state the source of the information and other details to lift it out of the present conjectural status?

FRANK HERSCHEDE,
Business Research Manager
Bell Aircraft Corp.,
Ordnance Division,
Burlington, Vt.

Sir:

Please inform us of the companies having already received orders, and what type of equipment is required.

A. R. WARBLER
Sav-Way Industries,
4875 E. Eight Mile Rd., Detroit 13

● **Additional information on Egyptian textile machinery orders placed in this country is contained in the issue for Nov. 23, page 132. Our News Front figure was in error and should be $4 million rather than $4 billion. The information came from the Egyptian delegation to the International Business Conference held at Rye, New York. Henry Khayat, Egyptian delegate, can furnish further details through his embassy.—Ed.**

McCULLOUGH IRON CO.

Sir:

My grandfather, John H. Adams, was in 1880 president of the McCullough Iron Co., Philadelphia. Was your magazine published at that time, and if so would your index of articles or advertisements about that time give any information about that company? My father was in the wholesale hardware business in Cincinnati when I was a boy, and I remember THE IRON AGE as a very important part of his reading. No doubt my grandfather was also a subscriber if it was in existence at that time.

RALPH E. CLARK,
Attorney-at-Law
Union Trust Bldg., Cincinnati 2

● ***The Iron Age*** **dates from 1855 but after a search of issues from 1875 to 1890, page by page in some years, we have not been able to find an item or advertisement about John H. Adams or the McCullogh Iron Co. We also searched through several volumes of reports of the American Iron and Steel Assoc. and an early History of Iron Manufacture, by James M. Swank. Perhaps some early directories of Philadelphia would disclose this information.—Ed.**

SPOT AUTHORIZATION SURVEY

Sir:

Your Washington office has suggested that we might write you for the survey conducted in early December among firms awarded spot authorizations, referred to on page 116 of the Jan. 4 issue. We should appreciate the report on this survey or the most complete and detailed information available.

DONALD R. LONGMAN
Chief, Research and Planning Div.,
Office of Civilian Requirements,
War Production Board,
Washington, D. C.

● **This article, including pie charts, contains the report on this survey. Additional copies of the report are available in reprint form.**

METAL CLEANING

Sir:

Metal Industry of London attributes to THE IRON AGE an article on "Low-Tin Bearings" by T. E. Eagan. The author describes a new process introduced for cleaning bearing backings before tinning, described as the "Kolene" process. We are eager to obtain fuller details.

A. J. MOORE,
General Manager
Dualloys Ltd.,
Croydon, Surrey, England

● **This cleaning technique is employed by the Kolene Corp., 315 Boulevard Bldg., Detroit. An article entitled "Metal Cleaning" in the July 24, 1941, issue of *The Iron Age* describes Kolene Kleaner as a new approach to metal cleaning. See also article entitled "Bonding Low-Tin Bearings to Iron and Steel" in the issue of Nov. 5, 1942.—Ed.**

METAL SPINNING

Sir:

We are trying to track down an article on automatic or semi-automatic spinning of metals that appeared in 1936 or thereabouts and specifically concerned the spinning of cuspidors. We are now confronted with a problem similar in nature and will be grateful indeed for any help.

HAROLD P. DRAKE,
Advertising Manager
Revere Copper & Brass, Inc.,
Rome, New York

● **We have had quite a few articles on the spinning of metal during the past few years but none has involved automatic setups. However, we call your attention to the following *Iron Age* articles: "Unusual Spinning Job," Dec. 5, 1935; "Metal Spinning," Aug. 24, 1939, p. 30 and "Industrial Metal Spinning," July 16, 1942, p. 43.**

CUSTOM ROLLING

Sir:

Can you give us the names and addresses of custom rolling mills, preferably in the Middle West, who may be interested in producing special ferrous alloys in the form of bar, sheet, plate and strip? Capacity for melting to specification would be desirable but not essential.

M. W. SMITH
The Duriron Co., Inc.,
Dayton, Ohio

● **A list of mills that could do this type of work has been sent.—Ed.**

NORMALIZING CASTINGS

Sir:

Where can we obtain information on the technique and advantages of normalizing grey iron castings?

J. W. OEFFINGER,
Chief Engineer
Anchor Stove & Range Co.,
New Albany, Ind.

● **The best general review of the subject is contained in the Cast Metals Handbook obtainable from the American Foundrymen's Assoc., 222 West Adams St., Chicago.—Ed.**

FORMING SPRING STEEL

Sir:

Please send me tear sheets on "Cold Working and Forming of Silicon-Manganese Spring Steel," by R. G. Sartorius from the Dec. 14 issue.

H. W. WHITNEY,
Metallurgical Engineer
Bliss & Laughlin, Inc.
Harvey, Ill.

● **Tear sheets are mailed.—Ed.**

BRAINS A HANDICAP

Sir:

THE IRON AGE is still first with the news. Note the enclosed clipping from the *N. Y. Times* of Jan. 5. I will remind you that in the Sept. 21 issue under the heading "Engineers vs. Salesmen," I declared: "Brains are a handicap to a salesman." Hoping you are the same.

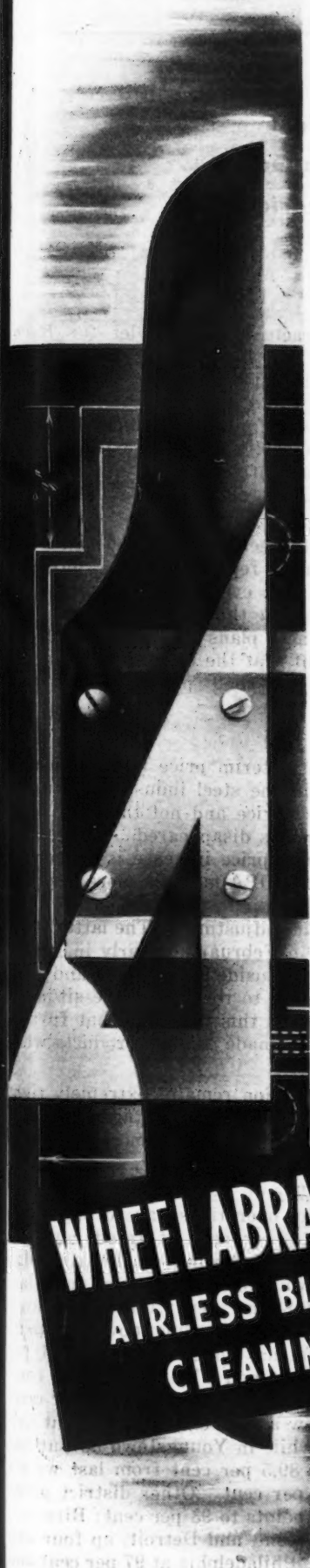
M. A. W.
New York

● **On Jan. 4, Forrest H. Kirkpatrick, manager of personnel administration of RCA-Victor division of Radio Corp. of America, addressed the American Management Association in New York, saying in part: "The preponderance of qualified opinion is that there is little if any relationship between intelligence and sales ability. Existing personality tests are of doubtful value in selection of salesmen, and some competent persons believe they are wholly without utility for this purpose."—Ed.**

Sir:

One of our engineers has requested a copy of your article on NE steels from the Dec. 14 and 21 issues.

J. M. FERTIG,
Librarian
Westinghouse Research Laboratories
East Pittsburgh, Pa.



a practical formula for blast cleaning efficiency

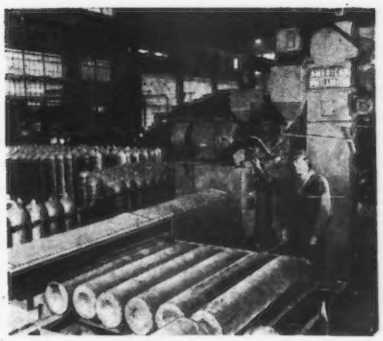
EFFICIENCY is America's overpowering wartime weapon . . . in the post-war competition of tomorrow it will become a prerequisite to maintaining business leadership. Efficiency in metal cleaning can be an important factor in lowering costs and bettering your competitive position. Here is a typical "case history":

The 202 year old Taylor-Wharton Iron & Steel Company has served our country in war production through every war in its history. In World War II, when production demands were met, the hand blast cleaning process formerly used was found inadequate.

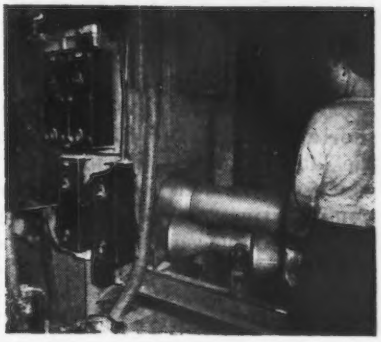
Faced with the necessity of finding a more satisfactory method of cleaning seamless steel gas cylinders they called on American's engineers. After a thorough survey of the problem, a carefully designed Wheelabrator Special Cabinet was recommended. As the work passes into the blast zone, steel abrasive thrown from the Airless Wheelabrator thoroughly scours the surface right down to virgin metal.

Whereas each piece required five or six minutes to be cleaned by sand blast, *three* cylinders are now completely cleaned in *one minute* by the American Special Cabinet. Production flows at a rate 15 times faster than under former methods.

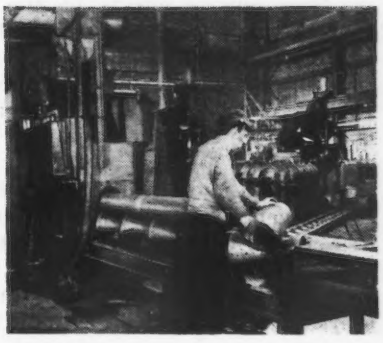
You are invited to submit your problems and samples of your work to our engineers for test-cleaning in our complete laboratory—they are qualified by wide experience to give you a practical "formula" for efficient handling of your metal cleaning problems.



1. Gas cylinders waiting to be cleaned by the Wheelabrator Special Cabinet.



2. Skewed dished rollers rotate the work at a predetermined speed during cleaning.



3. A complete conveyor system handles the work so operations are continuous.

WHEELABRATOR
AIRLESS BLAST
CLEANING

American
FOUNDRY EQUIPMENT CO.
510 SOUTH BYRKIT STREET MISHAWAKA, INDIANA

This Industrial Week.

- **Carryovers Mounting Fast**
- **Raw Steel Rate Fails to Gain**
- **Civilian Deliveries Precarious**

RECENT war news from the eastern and western fronts may again bring a surge of civilian hopes and optimism, but this time war programs and needs will be deaf to such reactions. The adverse effect on morale of the failure of last fall's "victory" to materialize has scotched any feeling on the part of the military to spend time on cutting back programs until Germany is definitely defeated.

From a steel production standpoint it is even more certain that regardless of war news every effort must be made to keep the raw and finished steel output rate from falling to new lows. Due to a combination of factors which may well have serious repercussions on already extended steel deliveries, the steel industry has not yet been able to regain its pre-holiday and pre-storm level.

Operating difficulties induced by weather and fuel shortage, as well as a difficult product-mix, complement the labor shortage in piling up finished steel orders which will be delivered far behind schedule. Production directives for February and probably for succeeding months placed increase emphasis on shell steel to be produced at the expense of hot rolled bars, semi-finished steel and steel, rails and order directives for emergency steel were continuing to roll in at a fast clip. This displacement will tend to greatly expand carryovers of previously accepted orders for these products.

The serious effects of the weather, manpower shortages and general worker fatigue are seen in the report that one steel mill in December, for the first time in 32 months, failed to meet its production directive. Currently it appears that such experiences may be more common during the next few months.

SEVERAL steel mills, apparently with WPB indulgence, are sifting some orders to insure that less critical consumers will be pushed off rolling mill schedules into carryovers, thus making certain that urgent war needs are not disturbed. This situation bears out previous contentions that civilian orders, even those classed as essential, would have to give way when they ran head-on with war business.

New orders in the past week while fractionally lower in volume than in recent weeks were still at a high level. There were indications that January volume at some mills might be twice as great as was registered in December. The higher order volume is bolstered by a lower cancellation rate.

Projected landing mat production in the second half of 1945 will require close to 350,000 tons of hot rolled sheets compared with about 480,000 tons in the first half. This reinstated program, which was regarded as a "dead duck" just a few months ago, will measure up to about two-thirds of the 1944 program.

Fabricating contracts have been let for Bailey bridge adapters requiring 15,000 tons of carbon and alloy steel shapes. Aircraft demand for stainless steel sheets continues heavy and a Navy inquiry involves 24,000 tons of special sheet piling and about 1200 tons of standard piling. Difficulty has been experienced in placing a sizable tonnage of concrete reinforcing bars for February and March rollings to be used in rehabilitation abroad.

Although the shell steel program received a tremendous shot in the arm a few months ago there were indications this week that even more substantial increases are in sight for the third and fourth quarters of this year. While these plans may subsequently be revised, it is significant that the number of new companies coming into the shell picture is surprisingly high.

WHILE the recent interim price increase caused some confusion in the steel industry because it applied to the delivered price and not the base price, most misunderstanding has disappeared. Contrary to some opinion the interim price increase is considered to be a stop-gap until the OPA makes a more complete detailed study of the steel industry costs after which it will make its final price adjustment. The latter is expected some time late in February or early in March. Despite guesses, so-called inside information and plain crystal gazing, those close to the steel price situation had no definite conclusions this week on what further price adjustments will be made on steel products when OPA has its final say.

The steel scrap situation remains extremely tight with further indications of more shortages. Allocations on scrap are expected to become more numerous with drastic action waiting in the background if supplies are not forthcoming.

National steel ingot operations have dropped one point this week to 92.5 per cent of rated capacity. Down this week are the following steelmaking districts: Pittsburgh, down two to 87 per cent from last week's revised rate of 89 per cent; Cleveland, down half a point to 89.5 per cent; Wheeling, down one to 91 per cent; Western District, down eight to 90.5 per cent; Cincinnati, down two and a half to 94.5 per cent, and the Eastern District, down 23½ to 82.5 per cent. Chicago operations show an increase of one point this week to 99.5 per cent while in Youngstown output has gained three points to 89.5 per cent from last week's corrected rate of 86.5 per cent. Other district gains include Buffalo, up six points to 93 per cent; Birmingham, up four to 99 per cent, and Detroit, up four and a half to 96.5 per cent. Philadelphia at 97 per cent and St. Louis at 94.5 per cent continue unchanged.

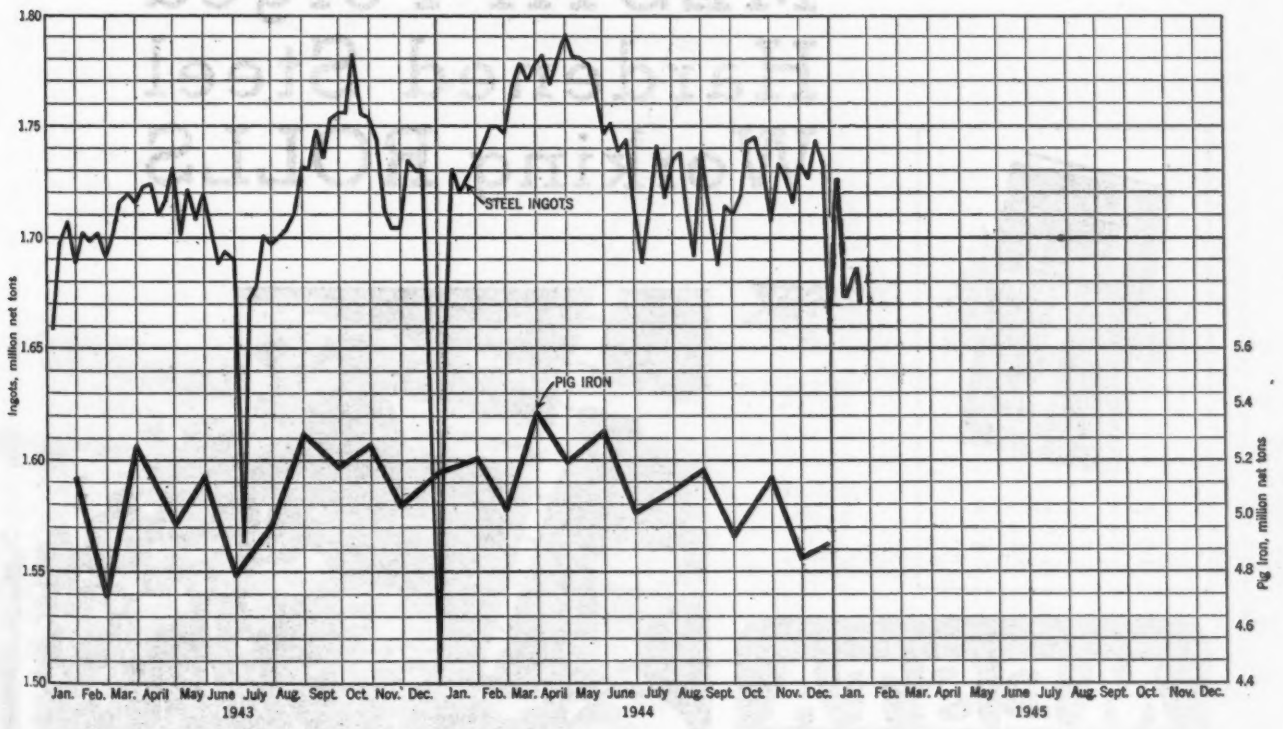
• **GAS SHORTAGE**—Curtailment of steel production in the Pittsburgh district because of gas shortage is expected to continue for at least a month, and possibly more. The industry is not so concerned as it might be if manpower were available to keep facilities in full operation. As it is, the manpower shortage dovetails nicely with lack of gas. The steel industry realizes that both gas and manpower are being diverted to industries carrying higher priority in the war effort, but points out that, by making the diversion, the government can only expect a lower output of steel. As much as is possible within the framework of existing regulations, this smaller output will be sent to the most essential consumers, spokesmen have indicated. Thus, a bad situation is being accepted with extremely good grace.

• **U. S. STEEL REBUTTAL**—Philip Murray's reported statement that negotiations between the Steelworkers' Union and the basic steel industry on compliance with the War Labor Board's recent wage decision have floundered "beyond reasonable hope" of agreement, is incorrect in almost every particular, John A. Stephens, vice-president in charge of industrial relations, U. S. Steel Corp. of Delaware, said recently. "On the contrary, we have reached complete agreement on some of the matters," said Mr. Stephens. "There have been no negotiations between the union and the 86 companies in the steel case," Stephens added. "Negotiations are in progress between the union and the steel manufacturing subsidiaries of U. S. Steel. This is in accordance with Mr. Murray's suggestion that negotiations with the other companies be deferred pending conclusions in those now in progress. We are attempting, and with some success, to reduce the language of the Labor Board's Nov. 25 Directive Order to labor contract provisions. We are now developing with the union the substance of a joint request to the board that certain points in its directive be clarified. Mr. Murray is wrong if he says that the companies are refusing to accept the directive. That statement is not true."

• **ASKS RECONSIDERATION** — Senator James M. Mead (Dem. N. Y.) of Buffalo has asked the War Department and the War Manpower Commission to reconsider a decision to close the machine-gun plant of the Buffalo Arms Corp., which is scheduled for Feb. 1. Sen. Mead reported that WMC officials were "sympathetic" to his argument that closing of the plant would result in a labor loss in the district. The suspension was announced by the Army Ordnance as a move to make the workers available for "must" plants. Mead contends that the Arms employees would not all take jobs in other factories.

• **IRON ORE SUPPLIES**—Inventories of iron ore available to steel mills are ample to maintain wartime production levels of the industry until the opening of navigation on the lakes in the spring, it was indicated in a report made to the board of directors of American Iron & Steel Institute by Elton Hoyt 2nd, senior partner of Pickands, Mather & Co., and chairman of the Committee on Ore Supply of the Institute. Mr. Hoyt predicted an inventory of around 16,000,000 gross tons of iron ore on hand at lower lake ports and blast furnaces on April 1, 1945. This will be smaller than in the years immediately preceding, but an adequate stock for that time of year. "It seems desirable to emphasize that the stocks of ore available for each company have been determined individually by the responsible officials in charge of raw material of each company," the report said. "To the present writing no concern has been shown by any one as to the ability of his company to meet the requirements brought about by the war effort from an ore standpoint alone.

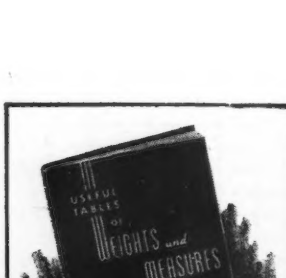
• **STEEL PAYROLLS**—A total of $143,137,000 in payrolls was distributed by the steel industry in November, an increase over the October total of $141,657,000 despite the shorter month, according to the American Iron & Steel Institute. In November a year ago $141,467,000 in payrolls were distributed by steel companies. The average number employed in the industry in November was virtually unchanged from the preceding month, the average being 564,200 in November as against 564,300 in October. In November 1943 the total number of employees in the industry was 611,000, a figure not comparable with the average number shown on the reports for 1944. Wage earning employees in the industry earned an average of 120.2c per hr. in November, compared with 118.3c. per hr. in October and 116.4c. per hr. in November a year ago. Wage earners worked an average of 47.7 hrs. per week in November, which compares with 46.3 hrs. per week in October and with 44.8 hrs. per week in November 1943.



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
January 16	89.0*	98.5	86.5*	97.0	90.0	87.0*	92.0	95.0	92.0	98.5	97.0	94.5	106.0	93.5
January 23	87.0	99.5	89.5	97.0	89.5	93.0	91.0	99.0	96.5	90.5	94.5	94.5	82.5	92.5

* Revised

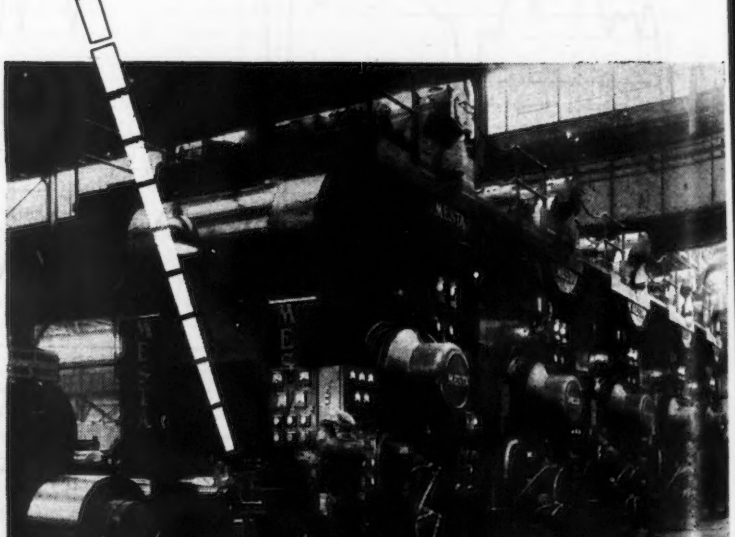
MESTA Forged Hardened Steel Working ROLLS



Send for your copy of this 64 page booklet containing valuable engineering data. Address your requests to Dept. A-3.

The Army-Navy "E" Flag with four stars, flies over the Mesta plant

BUY WAR BONDS



MESTA
MACHINE COMPANY
PITTSBURGH, PA.

No Definite Conclusion Drawn On OPA's Probable Final Price Move

Pittsburgh

• • Despite guesses, so-called inside information and plain "crystal gazing," those close to the steel price situation had no definite conclusions this week on what further price adjustments will be made in steel prices when the OPA renders its final decision some time in February or March.

At present, OPA is making a thorough study of over-all cost data submitted to it by most companies early this month. The conclusions drawn from this material by the OPA will determine whether or not the present interim increases are to be adjusted further and whether additional steel products will be advanced. A general consensus is that whenever final adjustments are made, they will affect the base price of some steel products and take care of items on which there has been a consistent out-of-pocket loss. This final decision can be also interpreted as finishing the job on the five products which were suddenly advanced by the Jan. 11 interim price increase sanctioned by OPA.

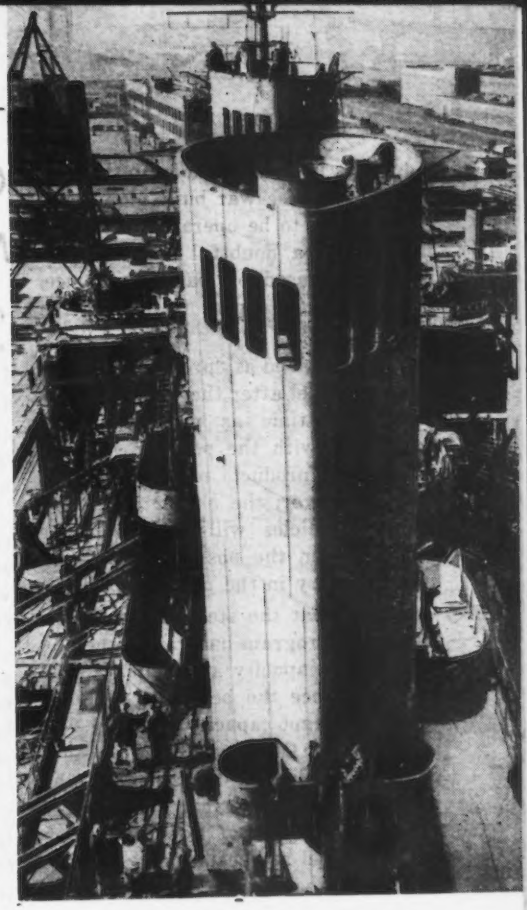
Some confusion in the industry occurred last week because of the method the OPA took to affectuate its interim price increase. General steel practice on advances has been to raise the base price. Because of factors involved, the interim price advance was obtained by adding the increase onto the regular delivered price.

Meanwhile rumors that the small non-integrated mills would be in for a squeeze play by inordinate price increases on semi-finished steel compared with finished product, seemed to be without foundation this week—if for no other reason than that the OPA has not itself made up its mind as to what its final steel adjustment will be.

This week the OPA interim price increase in the five steel classifications was said to be working out quite smoothly. The opinion in some quarters was that the OPA will expect fabricators, jobbers, warehouses and processors to absorb these advances with the exception of nails and staples, the pricing classification of which covers sales "to the trade." Certain jobber discounts are the rule in sales of wire products. Thus the OPA as far as possible is expected to keep the price increase from being passed on to the ultimate consumer who in most cases is the government.

Some sources believe that the margin of profit on most finished products for war use is sufficient to absorb the added steel costs. However, it is pointed out that if this is not found true, many war contracts are made on a fixed price basis with clauses providing for adjustments in the finished price when material costs are increased a certain pereentage over those prevailing at the time the contract was made. This leaves the door open for some relief. Likewise war product makers with cost-plus-fixed fee contracts are in the clear.

As to the warehouses, they are said to be disturbed over the fact that there has been no price adjustments to take care of the increases in steel prices. An OPA meeting in Washington recently undoubtedly considered this angle. In any event, warehouse operators may find that no price adjustments will be made until OPA makes its final steel price adjustments. Meanwhile, they may have to bear the brunt of the price increase.



TROOPSHIP TOPSIDE: *Looking down on one of the stacks on a new 20,000 ton troopship being built in Kearny, N. J. for the Navy. It is leashed to the outfitting pier in the yards as work progresses.*

o o o

U. S. Steel Plans For 50 Million Postwar Expenditure at Gary

Gary, Ind.

• • • United States Steel Corp. will spend not less than 50 million dollars for postwar improvements to its Gary mills, Irving S. Olds, chairman of the board, declared before the Gary Chamber of Commerce last week.

The program, for which no commencement or completion time yet has been set, includes improvements and additions to equipment for the handling of raw materials, extensive repairs and renovations of blast furnaces and machinery and improved facilities for the manufacture of wheels and axles at Gary works.

Cold reduction capacity will be increased at Gary sheet and tin mill for tin plate production. The facilities there also will be modernized "to keep pace with probable increased demand from the automotive industry," Olds said. At the American Bridge Co. plant, the bridge and structural steel fabricating plant, currently the second largest of its kind in the world, will be rebuilt and modernized.

"Our objective is to have the facilities at Gary as modern and efficient as any similar plant in the whole country, as well as of a size and character capable of properly taking care of the likely postwar needs of customers in the area served by the Gary mills," he said.

Tracing the history of steel production in the Chicago district, Olds pointed out that it had followed the demand for steel in the area which it served, and expansions were made voluntarily.

"It did not require a federal statute or regulation limiting the production or prescribing the market areas of the eastern steel mills. As markets for products of one kind or another have increased with the growth of population and have shifted to the West and to the South, the productive facilities of the nation have shifted to accord therewith. That course has generally been true of all industry; steel is no exception.

"Today there are advocates of a reverse program. A number of plants built for war time uses seem too large or otherwise unadaptable for normal peace time requirements. Whether new consuming industries can soon be established after the war in portions of the country not now possessing such

industries in order to take up the production of these war built plants and enable them to be operated in the future, poses a doubtful economic experiment. Based on past experience, the cart would appear to precede the horse."

Olds appraised as "promising" prospects for steel after the war, "at least until such time as production has caught up with the pent up demand for various products made largely of steel. However, the character of our national policies will have a direct bearing upon the possibilities of the steel industry in the postwar period."

Noting that the steel industry war expansion program had raised the nation's steel capacity approximately 15 per cent since the beginning of 1940 to a total ingot capacity of about 94,000,000 tons, Olds recognized as serious the problem of utilizing this capacity. Closing of marginal high cost facilities, creation of new and wider uses for steel as a consequence of intensified programs of research and technology, and development of larger export markets might solve the problem, he thought. He foresaw a particularly bright future in the development of new uses for steel, although recognizing competition from other materials.

Throughout his address Olds emphasized that demand for steel dictated its production, and that this demand could only be created by making it economic for steel consumers to operate.

"The steel industry of itself cannot create an overall demand for its product and thus maintain its plants in reasonably full operation. That demand is dependent upon general business conditions, and in the main is beyond the control of the steel producers. Customers are in the market for steel in large tonnages only when they can put their steel purchases to a profitable use. We can all help by exerting our influence toward the adoption of sound constructive national policies, such as a tax system which does not penalize and hinder industrial progress, and a labor program which is equally fair to both employer and employee and which recognizes and keeps their respective rights and obligations in our economic order," he said.

He revealed that, despite an acute manpower situation, the Gary mill had turned out the record breaking quantity of 5,713,649 tons of ingots, slightly more than its full rated capacity in 1944.

Olds Declares No Purchase Negotiations Under Way on DPC Plants

Gary, Ind.

• • • No purchase negotiations have been undertaken with Defense Plant Corp. by United States Steel Corp. as to any plant, Irving S. Olds, chairman of the Steel Corp. board, told reporters here last week.

As to the plant here currently operated by Tubular Alloy Steel Division of National Tube Co., most of whose equipment is owned by DPC, Olds said: "We all feel this plant is a permanent thing and that there is a future for the cold drawn alloy steel tubing produced here." He pointed out however that the Steel Corp. has no voice in the government's disposition of this equipment.

He declared, in response to questions, that doubts expressed in his formal speech that consuming industries could be established to support war built steel plants in remote sections of the country did not indicate disinterest by the Steel Corp. in purchasing Utah's DPC owned Geneva Works.

The Gary armor plate plant, however, he termed "purely a war plant," and expressed the hope that "we aren't going to continue indefinitely making armor plate for tanks."

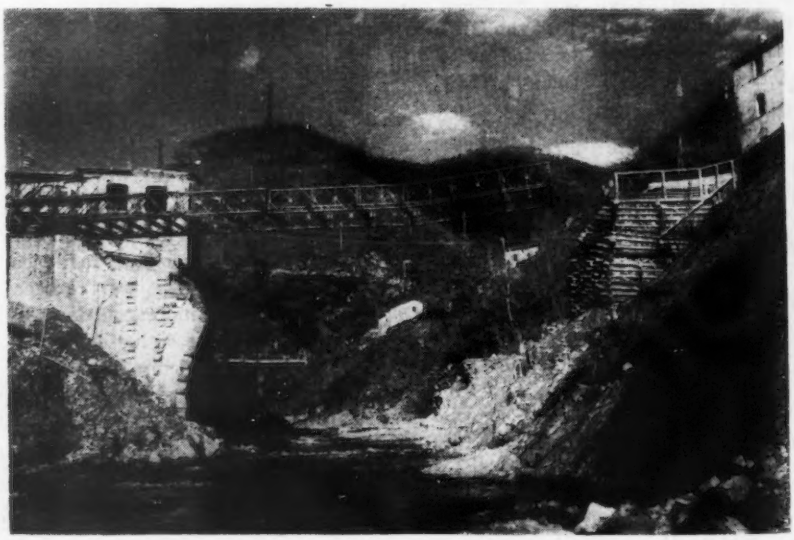
With regard to the possibility that the big American Bridge Co. plant here after the war might continue product fabrication, such as the manufacture of heavy earth moving equipment now being produced, Olds said "we would like to continue any industrial activity of this kind that is open to us in the postwar period." He saw a bright future for the railroad market both in rolling stock and rails insofar as railroad finances would permit. He also believes the industry would benefit greatly from a wave of housing construction.

Although no units at Gary now are down because of labor shortage, and the corporation hopes to continue its high rate of production, Olds crossed his fingers as to the future.

"We can't produce without men," he declared. "And you can't expect men to work 12 or 16 hours a day, as they are now doing, indefinitely. The effect of the 26-29 year draft is not yet known, but is ominous."

Markets still are the primary factor in determining the growth of production facilities here, and no shortage of raw materials is anticipated which would influence production plans, he said. Announced postwar plans are for a better utilization of existing ingot capacity rather than for expansion of raw steel making facilities, he declared.

BRIDGE BUILDING: *Fifth Army engineers construct a* 140-*ft. double triple Bailey Bridge at La Lima, Italy. This was a more difficult job than usual because no by-pass across the river was available and materials had to be taken to the west bank of the river.*



Steel Industry Executives Call for Showdown with John L. Lewis

Washington

• • • **Anticipating banked furnaces** for lack of coal and the possibility of a 9,000,000 to 12,000,000 ingot ton loss in production this year on account of 26 to 29 draft withdrawals, the WPB Steel Industry Advisory Committee on Jan. 18 unanimously endorsed "work or fight" **legislation and met "head** on" the threat of a coal strike by John L. Lewis's United Mine Workers when their contract expires by urging that the government discover and resolve any demands which may be made upon the mine operators by UMW immediately.

In the session, which featured bold recommendations by steel leaders to meet a threat of emergency shutdowns this year when munitions production is slated to boom $1,000,000,000 higher than any previous war period, the committee sided with the President on the draft of 4,000,000 4F's and opposed the recommendations of CIO and NAM.

On manpower, President Eugene G. Grace of Bethlehem Steel Co. reported that his company had had in the past year 26,000 separations, with a net loss of 5000 workers. President Benjamin F. Fairless of the United States Steel Corp., said his company had lost 27,000 workers in the same period, and had wound up with a net loss of 5000. Henry J. Kaiser declared that his company had been forced to hire 400,000 persons to maintain a working force of 60,000.

With coal supplies dangerously low and constantly deteriorating, it was revealed that eight companies representing 51 per cent of the industry as of Jan. 8 had two weeks' supplies; six companies representing 25 per cent of the industry had 15 to 25 days' supply, and that 14 companies had less than three weeks' supply. When supplies reach a 10-day level, it was said to be the general practice to bank furnaces.

Top WPB men said that if the work or fight legislation is passed, the resourcefulness of the industry would keep production losses down to 4 to 7 per cent, or between 3,000,000 and 6,000,000 tons. Industry members pointed out that green workers would not have the productivity of experienced ones if the industry loses the greatest part of its 60,000 men in the 26-29 age group.

WMC has designated the steel industry as critical and put most important workers last on the draft priority list, but industry leaders were not sanguine over the chances of retention of a high percentage of the young men who have been called the "vertebrae" of the industry.

The Steel Division reported that a 500,000-ton scrap shortage stares the industry in the face in the coming year, with the worst shortages around Chicago. Diminishing inventories have been explained by the unfavorable seasonal conditions and by the fact that inventories were allowed to sink lower than usual when many people in government and industry thought the war would come to an early end.

The WPB chairman for operations, Harold Boeschenstein, recently returned from a four-week inspection tour of the European front, emphasized that actual battlefield requirements usually outran the estimates. He disclosed that in many cases there was too long a lag between the period when the armed services requested materials and when these requirements were made known to industry. These specific needs must be "pinpointed" to get munitions where they are needed and at the proper time, he said.

Huge increases in steel needs for the Army ammunition program were foreseen by Maj. Gen. T. J. Hayes, acting chief of Ordnance. The Army official predicted that carbon steel requirements alone might increase from 2,020,000 tons in the first quarter of 1945 to more than 3,400,000 tons in the fourth quarter of 1945. Shell steel billets would account for 50 per cent of these totals, with 20 per cent for sheets, nine per cent for tubing and hot rolled bar, cold finished bars and plates in smaller proportions.

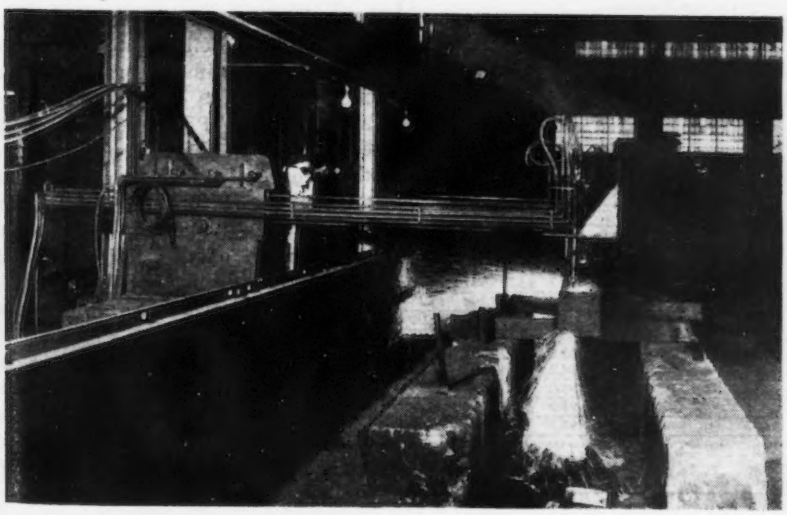
Brig. Gen. Roswell Hardy, chief of the ammunition division, Army industrial services, reported that the Army planned to spend over $6,000,000,000 for ammunition in 1945 as compared with something less than $4,000,000,000 in 1944. He reported that a large number of new facilities had been required for this program and that all contracts for increasing

New CF&I Chairman

New York

• • • **Charles Allen, Jr., partner of Allen & Co. and chairman of Wickwire Spencer Steel Co., has been elected chairman of the Colorado Fuel & Iron Corp., succeeding Arthur Roeder, resigned.**

CROPPING MACHINE: *Made-to-measure alloy steel blooms and billets are now being shipped from A. M. Byers Co. following the installation of this new hot cropping machine at the company's plant in Ambridge, Pa. The machine cuts blooms and billets by means of twin water-cooled torches using the oxy-acetylene process.*



these facilities had been placed. Pointing out that the demand for cannon expands with ammunition increase, General Hardy cited increased demand for more relining tubes for heavy cannon and increased needs for heavy recoil mechanism.

The increasing role played by rockets was described to the committee by Admiral G. F. Hussey, chief of the Navy bureau of ordnance, recently returned from the Pacific theater of operations. As an indication of the rapidity with which this type of ammunition was being used up, Hussey described one landing boat action in which 700 rockets were fired in less than a minute. The rocket program would be using 320,000 tons of steel monthly by the end of 1945, Admiral Hussey reported.

The Navy official also listed increased steel needs for the Navy's new high capacity shell used for shore bombardment and "softening up" beachheads. The new shell allows for greater fire power without increasing the calibre, it was reported.

Admiral Hussey also revealed a new potential demand for steel sheets due to the Navy's increasing use of Quonset huts. The Navy officer stated that these were one of the most useful pieces of equipment in service, citing their use as living quarters, machine shops, etc.

FINAL RETURNS: ***In the Jan.* 18 *issue of the* IRON AGE PAGE 101 *certain figures for 1944 steel output were not shown as revised. The chart below has the final figures with proper revisions.***

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1944

Based on Reports by Companies which in 1943 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.9% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,769,438	97.2	439,551	85.4	377,751	83.3	7,586,740	95.6	1,712,582	4.43
February	6,409,981	98.4	409,781	85.2	368,555	87.0	7,188,317	96.9	1,736,308	4.14
March	6,976,450	100.1	455,368	88.5	388,408	85.7	7,820,226	98.5	1,765,288	4.43
1st Quarter	*20,155,869*	*98.6*	*1,304,700*	*86.4*	*1,134,714*	*85.3*	*22,595,283*	*97.0*	*1,738,099*	*13.00*
April	6,788,433	100.6	437,472	87.8	362,118	82.5	7,588,023	98.7	1,768,770	4.29
May	6,878,251	98.7	437,444	85.0	380,960	84.0	7,696,655	97.0	1,737,394	4.43
June	6,462,108	95.8	419,699	84.2	347,028	79.0	7,228,835	94.1	1,685,043	4.29
2nd Quarter	*20,128,792*	*98.4*	*1,294,615*	*85.6*	*1,090,106*	*81.9*	*22,513,513*	*96.6*	*1,730,478*	*13.01*
1st 6 months	*40,284,661*	*98.5*	*2,599,315*	*86.0*	*2,224,820*	*83.6*	*45,108,796*	*96.8*	*1,734,287*	*26.01*
July	6,742,830	96.5	415,543	80.9	334,710	73.7	7,493,083	94.2	1,695,268	4.42
August	6,714,857	95.9	429,672	83.5	348,901	76.6	7,493,430	94.0	1,691,519	4.43
September	6,500,997	96.1	398,058	80.0	330,837	75.2	7,229,892	93.9	1,689,227	4.28
3rd Quarter	*19,958,684*	*96.2*	*1,243,273*	*81.5*	*1,014,448*	*75.2*	*22,216,405*	*94.1*	*1,692,034*	*13.13*
9 months	*60,243,345*	*97.7*	*3,842,588*	*84.5*	*3,239,268*	*80.8*	*67,325,201*	*95.9*	*1,720,112*	*39.14*
October	6,859,922	98.0	420,105	81.6	335,526	73.7	7,615,553	95.6	1,719,086	4.43
November	6,571,497*	96.9*	403,908*	81.0	298,503	67.7	7,273,908*	94.3*	1,695,550	4.29
December	6,680,007	95.7	373,549	72.7	284,743	62.7	7,338,299	92.3	1,660,249	4.42
4th Quarter	*20,111,426*	*96.9*	*1,197,562*	*78.4*	*918,772*	*68.0*	*22,227,760*	*94.0*	*1,691,610*	*13.14*
2nd 6 months	*40,070,110*	*96.5*	*2,440,835*	*80.0*	*1,933,220*	*71.6*	*44,444,165*	*94.0*	*1,691,822*	*26.27*
Total	80,354,771	97.5	5,040,150	83.0	4,158,040	77.6	89,552,961	95.4	1,712,949	52.28

Note—The percentages of capacity operated are calculated on weekly capacities of 1,572,755 net tons open hearth, 116,182 net tons Bessemer and 102,350 net tons electric ingots and steel for castings, total 1,791,287 net tons; based on annual capacities as of Jan. 1, 1944 as follows: Open hearth 82,223,610 net tons, Bessemer 6,074,000 net tons, Electric 5,330,880 net tons. Beginning July 1, 1944, the percentages of capacity operated are calculated on weekly capacities of 1,560,042 net tons open hearth, 116,182 net tons Bessemer and 102,737 net tons electric ingots and steel for castings, total 1,798,981 net tons; based on annual capacities as follows: Open hearth 82,604,600 net tons, Bessemer 6,074,000 net tons, Electric 5,372,150 net tons.

YEAR 1943

Based on Reports by Companies which in 1943 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.9% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,576,788	97.8	478,161	85.9	369,573	95.5	7,424,522	96.8	1,675,964	4.43
February	6,031,605	99.3	447,810	89.1	345,189	98.8	6,824,604	98.5	1,706,151	4.00
March	6,787,902	100.9	503,565	90.4	383,111	99.0	7,674,578	100.0	1,732,410	4.43
1st Quarter	*19,396,295*	*99.3*	*1,429,536*	*88.4*	*1,097,873*	*97.7*	*21,923,704*	*98.4*	*1,704,798*	*12.86*
April	6,510,824	99.9	482,478	89.5	380,401	101.5	7,373,703	99.3	1,718,812	4.29
May	6,669,703	99.1	482,424	86.6	397,564	102.7	7,549,691	98.4	1,704,219	4.43
June	6,202,889	95.2	453,663	84.1	382,801	102.1	7,039,353	94.8	1,640,875	4.29
2nd Quarter	*19,383,416*	*98.1*	*1,418,565*	*86.8*	*1,160,766*	*102.1*	*21,962,747*	*97.5*	*1,688,144*	*13.01*
1st 6 months	*38,779,711*	*98.7*	*2,848,101*	*87.6*	*2,258,639*	*99.9*	*43,886,451*	*98.0*	*1,696,423*	*25.87*
July	6,556,794	96.8	466,345	90.6	384,737	91.9	7,407,876	96.2	1,675,990	4.42
August	6,700,118	98.7	484,847	94.0	401,499	95.7	7,586,464	98.3	1,712,520	4.43
September	6,646,968	101.4	480,757	96.4	386,614	95.4	7,514,339	100.7	1,755,687	4.28
3rd Quarter	*19,903,880*	*99.0*	*1,431,949*	*93.6*	*1,172,850*	*94.4*	*22,508,679*	*98.4*	*1,714,294*	*13.13*
9 months	*58,683,591*	*98.8*	*4,280,050*	*89.5*	*3,431,489*	*98.0*	*66,395,130*	*98.1*	*1,702,439*	*39.00*
October	6,892,029	101.6	513,585	99.5	408,503	97.4	7,814,117	101.2	1,763,909	4.43
November	6,543,204	99.6	440,878	88.2	387,893	95.5	7,371,975	98.6	1,718,409	4.29
December	6,502,980	96.0	390,979	75.9	361,185	86.3	7,255,144	94.2	1,641,435	4.42
4th Quarter	*19,938,213*	*99.1*	*1,345,442*	*87.9*	*1,157,581*	*93.1*	*22,441,236*	*98.0*	*1,707,857*	*13.14*
2nd 6 months	*39,842,093*	*99.0*	*2,777,391*	*90.8*	*2,330,431*	*93.7*	*44,949,915*	*98.2*	*1,711,074*	*26.27*
Total	78,621,804	98.9	5,625,492	89.1	4,589,070	96.7	88,836,366	98.1	1,703,804	52.14

Note—The percentages of capacity operated in the first 6 months are calculated on weekly capacities of 1,518,621 net tons open hearth, 125,681 net tons Bessemer and 87,360 net tons electric ingots and steel for castings, total 1,731,662 net tons; based on annual capacities as of January 1, 1943 as follows: Open hearth 79,150,880 net tons, Bessemer 6,553,000 net tons, electric 4,554,960 net tons. Beginning July 1, 1943, the percentages of capacity operated are calculated on weekly capacities of 1,531,769 net tons open hearth, 116,494 net tons Bessemer and 94,667 net tons electric ingots and steel for castings, total 1,742,930 net tons; based on annual capacities as follows: Open hearth 79,867,450 net tons, Bessemer 6,074,000 net tons, Electric 4,938,960 net tons.

* Revised

Little Possibility Of Domestic Sewing Machine Production

Washington

• • • **WPB told the Domestic Sewing Machine Industry Advisory Committee at a recent meeting that the possibility of resuming domestic sewing machine production is extremely remote because of increased requirements for ammunition, communications wire and other war items.**

The supply status of materials and components normally used by sewing machine manufacturers was outlined, and as it related to metals was as follows:

Additional orders for cold rolled steel sheets, 16, 18, and 20-gage, cannot be filled until the end of the first quarter of 1945 or possibly the beginning of the second quarter.

Production of stainless steel, particularly of nickel alloy, is limited by the manpower shortage.

Brass mill alloy strip, rod and tube; brass mill copper products, and wire mill products are critical as a result of the expanded ammunition program.

Aluminum sheets in certain gages and heavy aluminum extrusions are critical, but other types of aluminum are still available.

The limiting factors in production of zinc die castings are facilities and manpower. Malleable iron foundries have a five-month backlog of orders.

Scrap Aluminum Stock Released for Sale

Washington

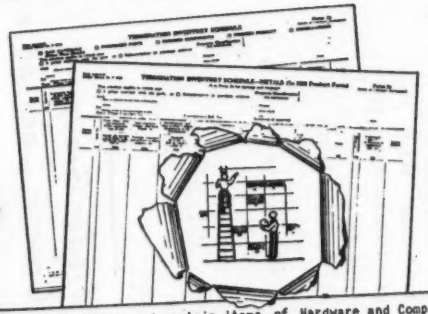
• • • **The Surplus Property Board, successor to the Surplus War Property Administration has announced that the Metals Reserve Co. had been authorized to sell for war production purposes aluminum scrap now held in storage. The order was issued on advice from WPB's Metals and Minerals Division that recent changes in the progress of the war have made an increase in the need for products made from aluminum. WPB said that some or all of the aluminum scrap now being held under SWPA Regulation No. 5 is needed to fulfill military requirements.**

The MRC price is to be not less than the prices set up in the regulation plus such amount as MRC may determine to compensate for the expense to the government of transporting and storing the scrap.

METALS RESERVE REDISTRIBUTION

TERMINATED CONTRACTOR'S PLANT

At Contractor's Plant, the termination inventory is SEGREGATED, CLASSIFIED (as to serviceability or non-repairability) COUNTED & INSPECTED.



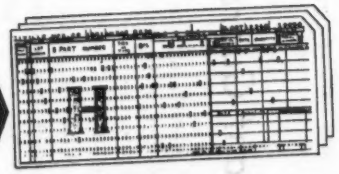
Aluminum, Steel, Copper and certain items of Hardware and Components comprise the items being redistributed under this program. These items, which are set forth in ASU Directive 45-10, 10 October 1944, are listed on the Termination Inventory Schedules as follows:

Schedule 2a - Metals, in Mill Product Form
Schedule 2b - Other Raw Materials, Purchased Parts, Finished Components or Finished Products & Miscellaneous

The letters MRC are inserted opposite such items on the form.

ASU
WRIGHT FIELD
DAYTON, OHIO

Copies of these forms are forwarded to the Aircraft Scheduling Unit; Att: Records Branch TSRRS-2



Metals Reserve Co. items are machine tabulated. (Exact description of the items on the 2a & 2b forms is essential to the success of this tabulating and cataloguing job)

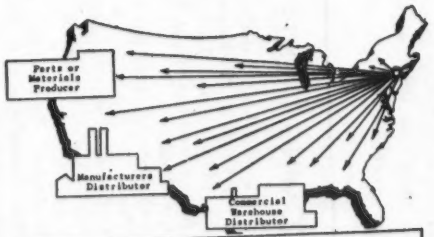
SUPPLY DIVISION
ATSC
AAF

AVIATION SUPPLY OFFICE
USN

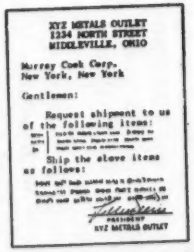
Copies of the listing are submitted to:
Supply Division, AAF ATSC, and to Aviation Supply Office, USN for their screening out of items of use in aircraft maintenance programs.

155 EAST 44th STREET
NEW YORK, N.Y.

Residual inventory, after ATSC & ASO deletions, is forwarded to Murray Cook Corp. central agent for Metals Reserve Company.



Murray Cook Corp. forwards a tabulation of the inventory to a country-wide group of M.R.C. Distributing Agents. These agents include Commercial Warehouses Distributors and Producers of the items etc.

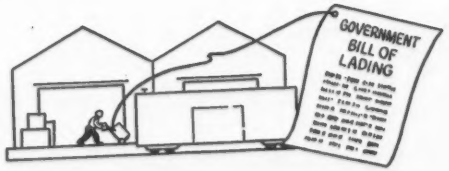


The distribution agencies review the tabulation and request items of which they can dispose. Such requests are accompanied by shipping and packing instructions on the items desired.

Murray Cook Corp. relays shipping instructions to proper Army Air Force Procurement District or Bureau of Aeronautics General Representative from whence the instructions are sent to the Plant Clearance Officer.

PLANT CLEARANCE OFFICER

The P.C.O. acquires title for Government where necessary.



The desired items are promptly packed and shipped in accordance with shipping instructions.

DISTRIBUTOR

Title passes to MRC upon acceptance by Distributing Agent.

SELLS TO

- AIRCRAFT CONTRACTORS
- OTHER WAR CONTRACTORS
- AUTHORIZED CIVILIAN CONSUMERS

TO: *Users of these Materials:*

The way to prevent post-war surpluses is to do your buying through these Metals Reserve Distributing Agents

Doubts Grow on Passage Of "Work or Fight" Legislation by Congress

Washington

• • • **Barring future serious** military reverses attended by heavy casualties, 4F or national service legislation passage by Congress this session is growing more and more doubtful in the opinion of some members of Congress as well as some war agencies.

Undersecretary of War Robert P. Patterson has asserted that war industries need 700,000 workers in the next six months, and this figure has been challenged by the unions and its accuracy is being doubted by the Mead (Senate) War Investigating Committee.

Pointing to the inaccuracy of manpower figures Senator Homer Ferguson of Michigan, Republic member of the Mead Committee, summed up a great deal of Congressional sentiment on manpower when he told THE IRON AGE:

"Before we advocate passage of national service legislation, we want to know the facts.

"When the government assembles figures on manpower demand, Plant X which needs 100 workers, figures that there will be 500 quits in a year, so it puts down its need as 600 workers. Plant Y which needs no workers also figures 500 separations and says it needs that many. Here you have an actual need for 100 workers, but you have a demand for 1100."

Two officials of the WPB and the WMC agreed with this viewpoint. One official said that the reported demand for 148,000 men in must plants is not a good figure because one-third of the plants on the list are not critical plants and because critical plants' needs in a number of cases are not stated. The other official said that the great difficulty with government manpower statistics and one great reason why they conflict is that frequently the viewpoint of a man who gives statistics from a personnel standpoint is necessarily divergent from that of a man who collects data from a production or a scheduling viewpoint. The latter manpower expert pointed out that the sources of figures are often mixed, and lead to confusion.

Senator Ferguson said that WPB, WMC and the Bureau of Labor Statistics should get together and adopt common standards for the collection of information so that Congress would have a reliable basis for making the decision of whether legislation is needed.

Meanwhile, production and manpower officials from WPB Chairman J. A. Krug to Selective Service Director Louis B. Hershey are gratified with the results of the Byrnes threat which warned all men between the ages of 18 to 37 that they should get into essential and critical war industry or else be drafted. Officials fear that if legislation is not passed, all the good which has been done by way of recruiting men to essential jobs will be dissipated, and men will once more drift away to nonessential activities.

At the same time, Mead Committee investigators are engaged in an intensive and searching survey of labor utilization in war plants. Whatever recommendation the committee makes, it is reported that it will propose that better labor utilization be made a government and industry goal.

Board Upholds Orders on Plant Guards

Washington

• • • **With industry members** dissenting, WLB on Jan. 19 upheld a directive order of the Third Regional WLB at Philadelphia which fixed the terms and conditions of work which it said were necessary to settle a dispute between the Jones & Laughlin Steel Corp. and the CIO-USW, bargaining agent for 100 armed plant guards at the Corporation's Pittsburgh works.

The corporation challenged the jurisdiction of WLB because of a decision of the Sixth Circuit Court of Appeals last Dec. 8, which denied an application of the NLRB to enforce an unfair labor practice order filed against Jones & Laughlin for refusing to bargain with the USW as certified bargaining representative of the armed plant guards at the corporation's Otis Works in Cleveland. The NLRB petitioned the court to reconsider its decision.

Edwin E. Witte, a public member of the WLB, said in a majority opinion that there was no connection between the Pittsburgh Works and the Otis Works, that WLB was not involved in the NLRB case and that, moreover, the court decision concerned an unfair labor practice in violation of the NLRB Act, whereas the War Labor Board case involves the determination of terms and conditions in a labor dispute "duly certified to us under the War Labor Disputes Act."

In a dissenting opinion, industry members Lee H. Hill and T. J. McDowell held that WLB should not have assumed jurisdiction and that the Board should be guided by the court decision in the Otis Works case, particularly because the Otis Works and the Pittsburgh Works were part of the same case before the NWLB before they were referred to the Cleveland and Philadelphia Regional Boards, respectively, for handling on certain issues.

COMING EVENTS

Feb. 26-March 2—A.S.T.M. 1945 Committee Week, Spring Meeting, Pittsburgh.
March 19-22—Machine and Tool Progress Exposition, American Society of Tool Engineers, Cleveland.
April 4-6—SAE National Aeronautic Meeting, New York.
April 12-14—Electrochemical Society, Inc., Philadelphia—Atlantic City Congress, Atlantic City, N. J.
April 26-27—Annual Conference, Open-Hearth Steel Committee and Blast Furnace and Raw Materials Committee, Iron and Steel Division, A.I.M.E., Chicago.
April 30-May 4 — American Foundrymen's Association, Detroit.

CANCELLED

Feb. 19-22—Annual meeting, Iron and Steel Division and Institute of Metals Division, A.I.M.E., New York.
March 19-20—American Society of Tool Engineers, Cleveland.
May—General Meeting, American Iron & Steel Institute, New York.
American Steel Warehouse Association, 1945 Convention, New York.

Metal Trades Group Cancels Convention

Chicago

• • • **For the second successive year,** the National Metal Trades Association has postponed indefinitely its annual convention. The 1945 meeting had been scheduled for Feb. 26-28 in New York City. If demands of railroad transportation lessen and the war situation permits, the association may hold a convention later this year, the executive committee has decided. More than 1150 member plants are engaged fully or partially in war work.

WMC Calls for Army Aid In Rail Crew Shortage in Buffalo Terminal

Buffalo

• • • **The proposal that the Army assign soldiers with railroad experience to help untangle Buffalo's freight snarl was offered this week "as a last resort" by Joseph D. Canty, area director of the War Manpower Commission. He said his office was prepared to certify to the War Department that the needed men were not obtainable in the local labor field.**

"I understand that the present situation is caused by the lack of men for yard crews," Canty explained.

Spokesmen for the railroads reported the snow clearance was well in hand, but that men now are urgently needed for operational functions.

Inability to get through enough cars with raw materials and to obtain empties to ship out finished products have had a serious effect on the area's output of durable goods for the war effort since Buffalo's freight yards were plugged by the blizzard on Jan. 2. Lost production of raw iron and steel in that time is estimated at 60,000 tons.

Iron and steel producers on Buffalo's South Side and in Lackawanna, which were hardest hit by the big storm, were in need of more than 1000 cars to get accumulated output rolling to war consumers, according to a survey made over the last weekend.

Curtailed coal shipments became a critical factor last week. Among the plants affected were Jewell Alloy & Malleable Co., Inc., which was forced to shut down four days for lack of fuel.

Donner-Hanna Coke Corp., which supplies Republic Steel and Hanna Furnace, as well as about 30 per cent of the fuel gas used in Buffalo, was reported facing curtailment unless more coal was received. Coal stocks of the plant were listed at five to six days' requirements, whereas a 30-day stockpile is normally carried.

Deliveries Extended On Hot Rolled Sheets

Pittsburgh

• • • **Hot rolled sheet deliveries are becoming more extended daily, with many mills now quoting late third quarter deliveries. The reinstatement of the landing mat program for a total of 350,000 tons for second half delivery brings the total 1945 program up to about two thirds of the 1944 program. Another 13,000 tons of sheets have been pegged for manufacture of the "blitz" can, and together these demands have helped bring the sheet picture to what it is now—the tightest since the war began.**

Furthermore, galvanized flat rolled products, already showing deliveries extended to August, only tend to tighten up the picture, but the trouble with these items is in galvanizing itself, as much as in sheet supplies.

Continued heavy demand for sheets for roofing and siding for various service storage and barracks buildings, several programs for which were announced some weeks ago, require a fair percentage of the sheet output each month. These orders, deliveries on which are being met each month on schedule, take over a large part of the available capacity before products for other uses can even be started.

Sheet Delays Causing Galvanized Shortage

Washington

• • • **Galvanized ware production is being restricted by the manpower shortage and increased delay in the delivery of galvanized sheets, the WPB galvanized ware manufacturers industry advisory committee reported at a recent meeting. Delivery of galvanized sheets in some cases has been as much as two or three months behing schedule, said committee members, who expressed concern about the possibility of placing orders to the extent of their quarterly allotments in 1945.**

This situation was attributed to the fact that demand for galvanized sheets, particularly for military purposes has increased beyond the stepped up production. Assurance was given the committee, however, that WPB would extend all possible assistance to the industry members in placing orders for material.

Foundry Meet Cancelled

Chicago

• • • **American Foundrymen's Assn. has cancelled its 1945 war production foundry congress scheduled to be held in Detroit, April 30-May 4.**

Although the meeting was to have been devoted exclusively to the presentation of technical papers and reports valuable to the production of castings for war purposes, the society's officers voted adoption of an emergency program to accomplish its aims with minimum use of transportation and hotel facilities.

46,000 Small Arms Workers Needed In Coming Few Weeks

Washington

• • • **Requirements for small arms ammunition, according to WPB, will call for 46,000 additional workers within the next few weeks. This information was presented at a recent meeting of the Small Arms Ammunition Labor Advisory Committee.**

The committee recommended that: (1). WPB, WMC and the War Department make available accurate information as to production schedules; (2). they publicize only actual manpower required at specific times to avoid turning away applicants for jobs in this industry who might not be needed for a period of several months.

Army spokesmen outlined the urgent need for increased production in small arms ammunition. Total expanded 1945 requirements for small arms ammunition will run to 9,726,000,000 rounds, Army officials said.

Power Division Purchased

Dayton, Ohio

• • • **Purchase of the western division of the Marion-Reserve Power Co., Sidney, Ohio, including the electric systems serving Urbana and Marysville, for $7,950,000 by the Dayton Power and Light Co., was announced recently.**

The new property serves electric power to consumers in Van Wert, Mercer, Darke, Preble, Auglaize, Shelby, Hardin, Logan, Champaign, Clark, Union, and Delaware counties, Ohio.

No change in personnel, operation, or rates is contemplated and the same type of facilities serving other properties of the Dayton company will be extended to the new property.

Industrial Briefs . . .

• INDUSTRY SALUTED — For the second consecutive year Allis-Chalmers Mfg. Co. will honor one American industry each month as an intermission feature on its Sunday night broadcasts of the Boston Symphony Orchestra. Industries scheduled for tribute are coal, marine, railroad, processed foods, textile, automotive and aircraft.

• ROCKFORD CLUTCH—The name of Rockford Drilling Machine Division of Borg-Warner Corp., Rockford, Ill., has been changed to Rockford Clutch Division. The division has acquired the Borg-Warner research laboratory at Rockford and will operate it as the Rockford Clutch Engineering Laboratory.

• FIRE PREVENTION HONORS — Gary works of Carnegie-Illinois Steel Corp. has won the 1944 award of the National Fire Protection Association for fire prevention and protection for the year in competition with 2121 cities and towns in the United States and territories, and Canada.

• TRIPLES PRODUCTION — By stepping up schedules and increasing working hours, in some departments to seven days a week, the Hammond, Ind., plant of Pullman-Standard Car Mfg. Co. speeded up the output of 81 mm. trench mortars in December to three times the average monthly production maintained during the rest of 1944. The plant also has just placed in operation a line to produce 5-in. Navy anti-aircraft shells converting 155 mm. shell production.

• COLORADO RECORDS — Open hearth and blast furnace departments at Colorado Fuel & Iron Corp., Pueblo, set production records in 1944 with outputs of 1,293,972 net tons and 752,738 net tons, respectively. Previous records, set in 1943, were 1,207,401 tons and 709,896 net tons respectively.

• PLANS CONSTRUCTION — A contract for the construction of the Ohio Oil Co.'s new gasoline refinery and recycling plant in Bakersfield, Calif., estimated to cost more than $500,000 with equipment, has been awarded the Fluor Corp., Los Angeles. Plans provide for power units and a distillation area.

• PURCHASES — Greenfield Tap & Die Corp., Greenfield, Mass., has announced the purchase of the Geometric Tool Co. of New Haven, Conn.

• ORGANIZED SOCIETY—Lubrication engineers representing prominent industrial and transportation companies and educators have organized the American Society of Lubrication Engineers, with headquarters at 135 South LaSalle Street, Chicago.

• ESTABLISHES DIVISION — Detroit Steel Products Co., Detroit, has announced establishment of the new Fenestra Building Panel Division, which will produce and market a broad line of metal building panels for use in industrial, commercial and residential construction.

• A.F.A. CHAPTER — Formation in Portland, Ore., of the 29th chapter of American Foundrymen's Association has been approved.

• ACQUISITION—All patents and formulae pertaining to the Lubraloy Process of Self-Lubricating Packing, have been acquired by the Flexrock Co., Philadelphia. Just as soon as new equipment can be installed, the company will start production.

• PURCHASES PLANT — Semlo Properties, Inc., Buffalo, N. Y., a holding concern, has purchased the foundry plant formerly operated by the Crane Co. at Wheatfield, for more than $100,000.

• BUYS BUILDING — Buffalo Aeronautical Corp. has purchased a two-story building in Buffalo's "automobile row" for postwar use as an aircraft display center.

Enforcement Powers Of WLB Tool and Die Commission Amended

Washington

• • • WLB has amended the authority of its Tool and Die Commission to provide that all cases involving enforcement of the provisions of the Wage Stabilization Act in matters under the Commission's jurisdiction shall be determined by the Enforcement Division of the Eleventh Regional WLB at Detroit rather than by the Commission. The Tool and Die Commission was established by an order of the National Board on Dec. 11, 1942, when maximum wage rates for more than 50,000 tool and die workers in all jobbing and manufacturing plants in a six-county Detroit area were to be administered.

The Commission makes, subject to review of the Regional Board, final decisions in all dispute cases, voluntary applications for approval of proposed wage adjustments and any other matters affecting the tool and die industry within the jurisdiction of the Eleventh Regional WLB, which covers the state of Michigan.

The board also has acted on changes in the regulations of the Office of Economic Stabilization which provide that WLB shall "determine" rather than "recommend" the amount of unlawful wage payments which shall be disregarded by the Executive Departments and other agencies of the Government in determining costs of expenses for income tax or other purposes.

Election of Eastern Car Foremen's Officers Announced

New York

• • • At the annual meeting of the Eastern Car Foreman's Assn. held in the Engineering Societies Building recently the following officers were elected to serve for the coming year:

K. H. Carpenter, Scranton, Pa., of the Delaware and Lackawanna and Western R. R., president; G. H. Massy, Elizabeth, N. J., of the C. R. R. of New Jersey, 1st vice-president; P. J. Hogan, New Haven, Conn., of the New York, New Haven, and Hartford R. R., 2nd vice-president; T. G. Case, New York, N. Y., of the Grand Central Terminal, treasurer; and W. P. Dizard, New York, of American Car and Foundry Co., secretary.

Appointment of Wallace Poses Economic and Political Questions

Washington

• • • President Roosevelt's appointment of Henry Wallace as Secretary of Commerce after ousting Jesse Jones from the position has left business nonplussed but predictions are that, despite the fight that will be made against him in the Senate, Wallace will be confirmed. In his letter to Mr. Jones the President said that Mr. Wallace campaigned vigorously for the fourth term, wanted the position as head of the Department of Commerce, was "fully suited" to it and deserved to get what he wanted. This bold endorsement given by the President on his fourth term inauguration on Jan. 20, is, in view of his unparalleled political power, considered a command that will have to be respected by the Senate majority which he controls. Moreover, this reward for Mr. Wallace, whose long political career has been marked by attacks on so-called "big business," is held also to be payment to Sidney Hillman's CIO Political Action Committee and all it represents for its effective campaign for the President after it had failed to have Mr. Wallace renominated for the vice-presidency.

The position of Secretary of Commerce is a rich plum. It carries with it, by reason of an executive order, the RFC and its subsidiaries, representing assets that Mr. Jones said total about $20,000,000,000. They include the Defense Plant Corp., the Rubber Reserve Co., the Metals Reserve Co., and the War Damage Corp. with vast power of loaning money, paying subsidies and constructing plants. So great is the power and so enormous the sums available that it is maintained it can be used to reshape the economic structure of the country. In the hands of Mr. Wallace with the aid of Mr. Hillman and his satellites, opponents to the appointment of Mr. Wallace share the view of Mr. Jones that "The prospect cuts into broad social and political questions, labor matters and the whole American system of private enterprise."

Assets under the control of the Secretary of Commerce include steel plants, foundries, shipyards, airplane plants and other enormous war built concerns now leased by RFC that will return to it for disposition at the war's end. This means the manner of operation, whether by government or private enterprise, and as is well known, various proposals, which easily might suit the fancy of Mr. Wallace, call for the use of these plants to socialize industry.

Recognizing the power that Mr. Wallace would be given if made Secretary of Commerce and fearing the misuse he would make of it, Senator George, Democrat of Georgia, chairman of the finance committee, has introduced a bill stripping the Secretary of Commerce of all authority over federal lending activities and reestablishing RFC as an independent government agency.

• • •

Freight Picture Is Bogging Down With More Coal Loading

Pittsburgh

• • • Following an enviable record of keeping the freight moving, the railroads in this area are beginning to bog down and freight shipments are not moving at anywhere near schedule. Mills report that both incoming and outgoing shipments are slowed down to a walk and the weather has interfered greatly with even intermill materials movements on the company owned railroads.

On the plant outgoing interchanges, the sidings from which the main line railroads pick up loaded freight cars, steel producers indicate that the jam up is the worst that they can ever remember, and railroads are helpless to do anything about the matter.

Two railroads, the New York Central and the D. L. & W. have announced curtailment of certain passenger service in northern Pennsylvania and southern New York, only to keep the freight moving. This is expected to provide both additional manpower and locomotive equipment for moving critical war goods.

The inter-company railroads for steel plants here report that they are working all equipment that is serviceable and that many of their crews are reporting for two shifts, that is, working 16 straight hours in order to keep material moving. One company reported that outgoing shipments last week were down considerably because their railroad had not been able to handle the material and because truck movement had practically ceased.

Another company stated that an additional 300 cars of coal had to be forced on the already strained facilities and this was causing a great deal of trouble.

Inventors Needed

New York

• • • Among a list of 25 inventive problems for which the Navy is seeking solution are the following:

1. A cheap and effective barrier to prevent the propagation of cracks in steel structures, without making use of riveted seams and the caulking, etc., incidental thereto.
2. A method of welding high pressure piping without the aid of backing straps or with back straps which would be soluble in a harmless solution which could be introduced in the pipe before putting same into service.
3. A method of measuring the elastic stresses locked up in steel or other metallic structures at and beneath the surface of the material without having to dissect the structure in order to record the elastic recovery which results from isolating various segments.
4. A method of welding light gage aluminum. (Th's is of particular interest since aluminum lifeboats and life rafts are currently riveted due to the lack of a satisfactory method of welding.

Suggested solutions should be prepared in sketch and description form and sent to the National Inventors Council, Department of Commerce, Washirgton, D. C., for consideration and report.

Jones and Laughlin To Lose Accumulated Scrap Stock

Pittsburgh

• • • WPB this week allocated 40,000 tons of billet and bloom crops, low phos., and heavy melting scrap from reserves that have been built up by the Jones & Laughlin Steel Corp., during the past six months. Jones & Laughlin consistently maintained large inventories of high quality scrap during the period when scrap prices declined and many steel producers reduced inventories.

The 40,000 tons were split three ways: Republic Steel Corp., will get 20,000 tons; Youngstown Sheet and Tube Co., will get 10,000 tons; and the American Rolling Mill Co., will get 10,000 tons. Because of the high quality and nature of the scrap, it is believed that an adjusted price has been approved.

Minerals Cartels Are Discussed In Committee Report

Washington

• • • While President Roosevelt on Jan. 10 asked the Senate to return the Anglo-American petroleum agreement, which the American oil industry had attacked as an approach to a cartel system, the Senate Committee on Small Business on Jan. 16 released a report of its subcommittee on Mining and Minerals Industry which discussed the question of international minerals control. Among such controls mentioned was the allocation of world markets for both minerals and metals (non-ferrous) among producing nations.

Somewhat the same effect may be obtained, said a note in the report, by means of private cartel agreements entered into by the explicit or implied permission of governments, excepting that the benefits of such agreements may be shared only by limited groups and other groups may be damaged thereby or driven out of business entirely. In other cases, it was pointed out, nonparticipants, producing without restriction, may receive the major benefits of the improved prices resulting from curtailed output by cartel members. Exorbitant prices, said the report of the subcommittee, headed by Senator James G. Scrugham, Democrat, of Nevada, may be set for vitally needed products by cartel members.

"Privately and nationally sponsored cartels have had an increasing vogue abroad," the report said, "and there is some reason to believe this trend is on the upswing. Strong statements have been made to the effect that such cartels have had and will have an adverse effect upon our economy and especially upon that of our western states.

"Whether we should join in the movement toward such control of minerals or resist them is of the utmost importance to the domestic mining industry and should be given serious consideration."

The question now arises whether the President's request for withdrawal of the Anglo-American petroleum pact, together with his condemnation of cartels in his message to Congress on Jan. 6, will doom any possibility of setting up cartels such as the subcommittee discussed. The answer is not simple because of the difference in views with respect to the meaning of proposed national agreements.

The administration, unlike the oil industry, has said that the proposed oil pact was not a cartel. In his message to the Senate asking that the agreement be withdrawn, the President said he felt that the fears expressed by the oil industry were without foundation, but that he had followed the suggestion of Secretary of State Stettinius with a view to drafting a new agreement "to remove grounds for misunderstanding." The new draft has been prepared by the Petroleum Industry War Council, and it is claimed, it removes any possibility of Federal control of the American oil industry. In a letter of Aug. 21, last year, to Chairman Tom Connally of the Senate Foreign Relations Committee, President J. Howard Pew of the Sun Oil Co., assailed the Anglo-American Petroleum agreement as "innocuous or vicious as its administrators desire to make it." He added that it was a possible first step towards a "super-state cartel covering the petroleum industry in all parts of the world for the postwar years."

In his attacked on cartels in his message to Congress, President Roosevelt said:

"We must make sure that private enterprise works as it is supposed to work—on the basis of initiative and vigorous competition, without the stifling presence of monopolies and cartels."

Yet if the President does not consider the Anglo-American petroleum agreement a cartel, his statement does not make clear how far the administration would go to support such international controls as are discussed by the Senate Subcommittee on Mining and Minerals Industy. Nor is it clear how the attack on cartels can be reconciled with the fact that the Department of Agriculture is the sponsor of the existing Senate approved international commodity agreements on wheat and sugar.

There are numerous other subjects discussed by the Senate subcommittee report highlighting the major problems which, it is pointed out, will confront the mining industry as the war pressure for strategic ores and metals has subsided and peacetime production levels are resumed. Foremost among these problems is what to do about the premium price plan which will expire on July 31. The subcommittee has conducted an unremitting fight for continuation of the plan on its existing basis for at least another year.

"No question has been so vexing as that of subsidies as exemplified by the premium price plan," according to the subcommittee. Opinions are widely divergent, the report said, and "all of this is, of course, tied in to the subject of inflation."

It also said there is controversy

YANKS LEND A HAND: *Complying with Gen. Eisenhower's wish that U. S. Engineer Corps men should help to rebuild London, 3000 American soldiers are working as plumbers, joiners, bricklayers, glaziers and laborers. Here a group of soldier builders unload cement from a lorry. The pay, transport and feeding of these men will be provided by the U. S. Army authorities.*

New MUREX WALL CHART

A helpful guide to selecting the right Electrode for the job

This new chart, just off the press, contains a complete list of Murex Electrodes divided into four groups for quick reference; mild steel, special steels, stainless steels and hard surfacing. Electrodes are described according to AWS-ASTM class. Color identification, recommended current strengths, polarity, and physical properties are also given. In addition, there are brief descriptions of the electrodes' general characteristics and applications.

The chart is 24" x 37", printed in four colors.

Copies will be sent free to those who request them on their company letterhead.

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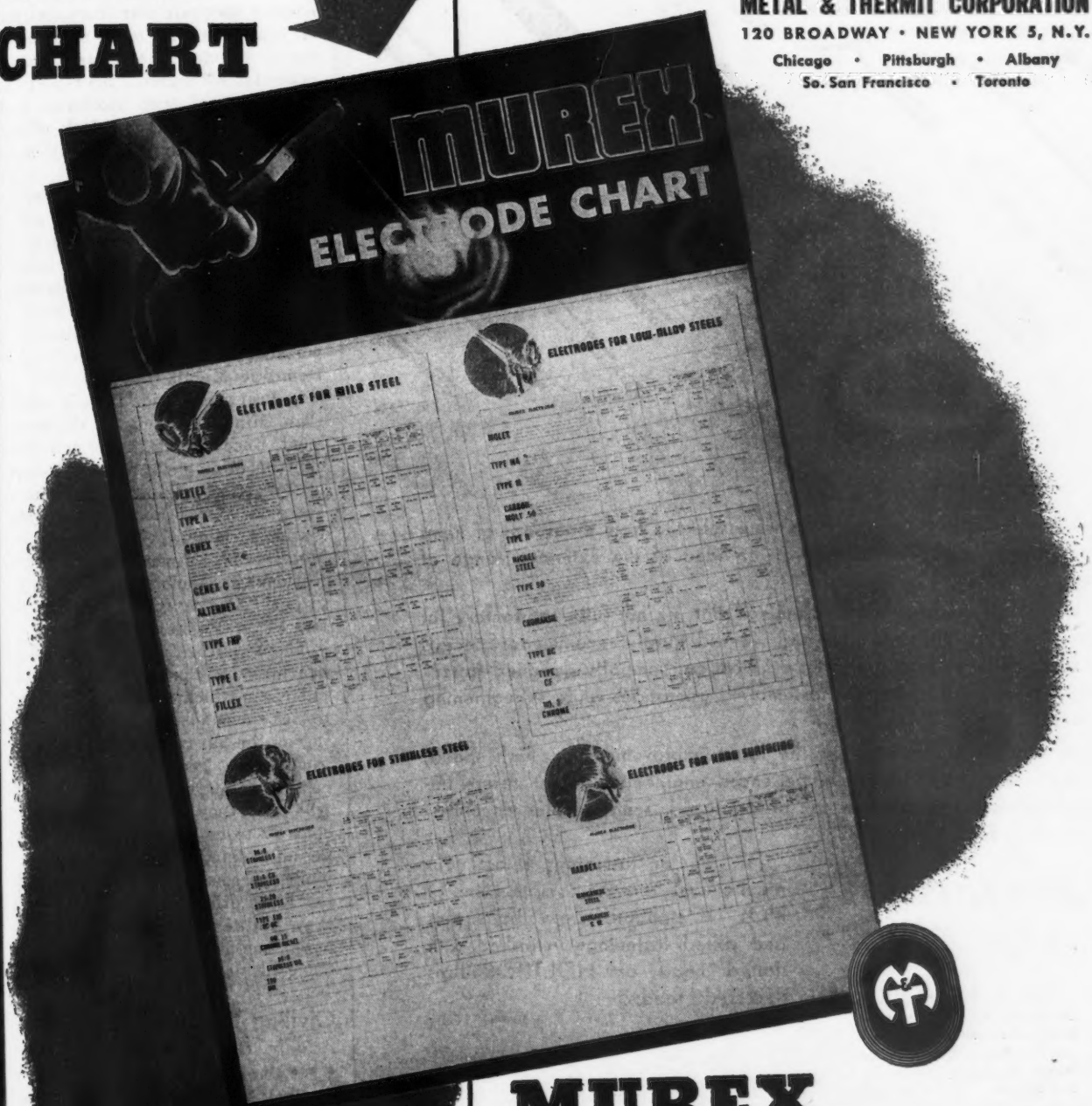
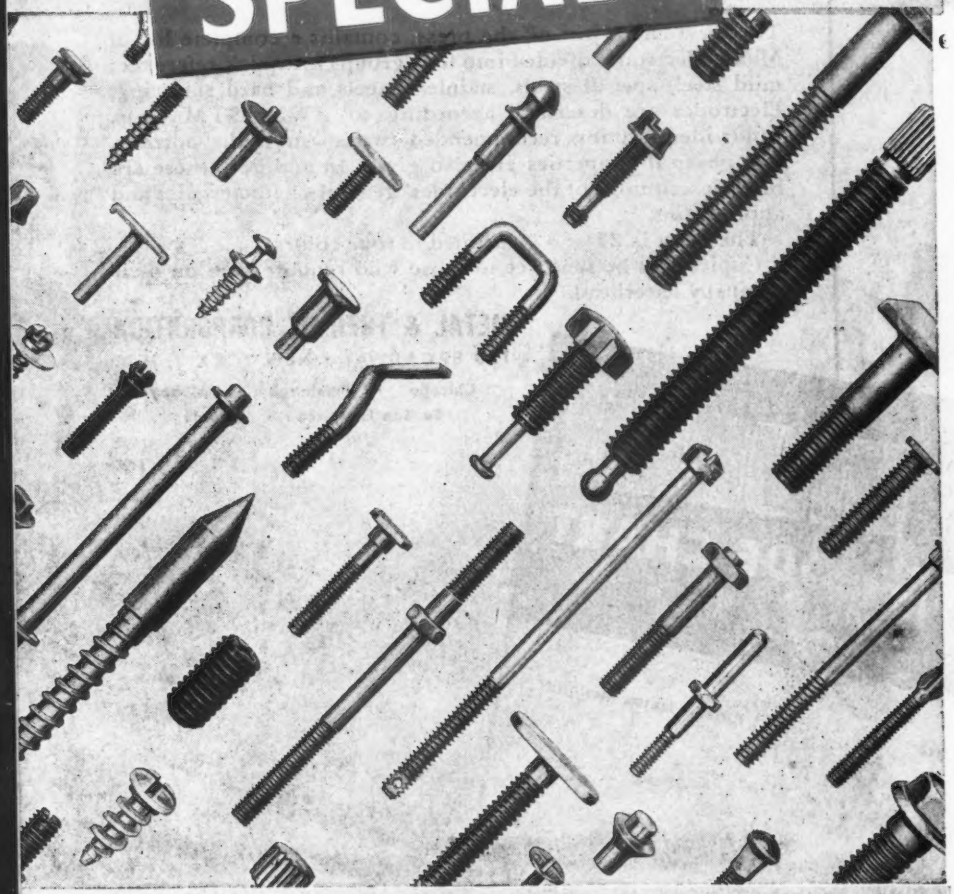


MUREX *Electrodes*

HOLTITE SPECIALS



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over whether control of the va stockpiling accumulation, includi the determination of policies and o jectives, shall be in the hands of Army and Navy agency rather th under the general supervision of board established by Congress. Atte tion is called to the fact that "so believe that procurement should principally from foreign source while others hold that preferen should be given to domestic mineral

"The possibility of starting a ra between nations, each attempting acquire adequate war stockpiles, mu be considered, as must also the el ment of international amity at t peace table," declares the report. "T acquisition of such stockpiles mig be considered to show lack of con dence in whatever plans may be pr posed."

Separate sections of the report di cuss 13 plants which at one time another have been proposed to st bilize the nonferrous mining industr The subjects include the following:

International Minerals Controls, th Problem of Metal and Mineral In ports and Exports, Parity Prices fo Domestic Metals and Minerals, Sub sidy Programs Aside from a "Parity Plan, Mine Financing by the Gover ment, Encouraging the Private Finan cing of Mining Properties, Recover of Wartime Capital Investment Marginal Ore Body Conservation National Mineral Resource Survey Metal and Mineral Stock Piling National Technological Research Pro grams, "X" Day for Mining, and Gol and Silver Problems.

The report refers to recently hel hearings by the Scrugham subcom mittee, in which the testimony of wit nesses showed a definite split in thin ing on the part of the small and mar ginal mine groups, and says tha comments such as, "there are thos who say they wish all governmen controls to be removed at the earlies possible date," were expressed. Bu while these same people were demand ing "fair prices and ample markets, they failed to "indicate how thi happy condition can be achieved with out controls."

Civilian Truck Output Begun

Atlanta, Ga.

• • • Chevrolet Motor Division o General Motors Corp. has complete plans for the manufacture of civilia motor trucks here. The first vehicle are now being produced, along wit military truck production to which th Atlanta plant formerly was exclusive ly devoted.

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① **MICHIANA Fire Armor. 65% Nickel, 20% Chromium.**
DESCRIPTION AND USE. A high grade heat-resistant alloy possessing superior properties in certain high temperature applications where corrosion is also a factor. Its high Nickel content also increases its resistance to carbon absorption. This alloy has proved particularly economical in long cycle applications.
TYPICAL USES: Carburizing containers, retorts, furnace parts and fixtures, salt pots.

② **MICHIANA Zorite. 35% Nickel, 15% Chromium.**
DESCRIPTION AND USE. High strength at elevated temperatures. Is the most universally used grade in the field of heat treatment. Along with other high Nickel alloys, it is not recommended for use in the presence of sulphurous atmospheres; but under practically all other conditions, this grade shows remarkable durability and therefore economy.
TYPICAL USES: Furnace parts such as rails, beams, supports, rollers. Also carburizing containers, annealing boxes, salt pots, retorts, trays, fixtures, magnesium retorts, etc.

③ **MICHIANA No. 100. 25% Chromium, 12% Nickel.**
DESCRIPTION AND USE: This alloy has superior qualities under certain high temperature corrosion conditions particularly where sulphurous gases are present. It is only slightly inferior to Zorite from standpoint of strength at high temperature. Because of its greater affinity for carbon it is not recommended for use in a carburizing atmosphere nor in contact with carbon.
TYPICAL USES: Much the same as indicated for Zorite with the exception above mentioned. Also as indicated it would be preferred in the presence of a sulphurous atmosphere.

④ **MICHIANA No. 48. 28% Chromium, 8% Nickel.**
Similar to No. 100, having somewhat higher resistance to sulphurous atmospheres at high temperature. This composition does not fall within the stable Austenite formula however.

⑤ **MICHIANA No. 55. 33% Chromium, 3% Nickel.**
There are a few heat-resistant applications where a high Nickel content is detrimental. An example of this would be where Copper, which has a high affinity for Nickel, comes into contact with such an alloy at high temperatures more particularly above 1600° F. Also in some cases, detrimental catalytic action has resulted from a high Nickel content.
In these instances, the above alloy would be specific, but it will be understood that in all cases, the maximum permissible Nickel would be used to minimize other detrimental effects of low Nickel.

Further details and many illustrations, design stress tables, etc. are included in our recently published Booklet 110. A copy will be forwarded on request. MICHIANA PRODUCTS CORPORATION, Michigan City, Indiana.

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Favorable Factors Seen for Aluminum Industry in Brazil

EUGENE F. HORN

Rio de Janeiro

• • • **There are a number of factors favorable to the establishment of the aluminum industry in Brazil, among them being the large deposits of bauxite, adequate deposits of flourite, great possibilities for the development of hydro-electric power, abundant and cheap labor, an internal market with great possibilities for expansion, and, finally, the policy adopted by the Brazilian Government favoring the development of new industries.**

Over 80 deposits of bauxite have been discovered in Brazil in the States of Minas Geraes, Rio de Janeiro, Espirito Santo, Bahia, Paraiba, Goiaz, Para, Maranhão and São Paulo and the reserves of this mineral are estimated to be about 150,000,000 tons. Those in Minas Geraes are most important with regard to quantity and quality. In this State deposits of bauxite occurs at Poços de Caldas, Ouro Preto, Nova Lima in the property of the St. John d'El Rei Mining Co., Couto de Magalhões near Diamantina, Conselheiro Lafayette, Serra de Ouro Branco, Derra de Curral and Lagoa Dourada.

The bauxite deposits near Poços de Caldas are the most extensive and the highest grade of any so far discovered in Brazil. They are derived from the decomposition of nephaline rocks and the reserves are estimated at 100,000,000 tons yielding bauxite ores containing from 57 to 64 per cent alumina (Al_2O_3) with low percentages of iron and silica. Poços de Caldas is situated in southern Minas Geraes 323 miles by rail from the port of Santos. The deposits of bauxite at Motuca near Nova Lima and those in the region of Ouro Preto are also of high grade.

An analysis of bauxite ore from the Morro do Cruzeiro deposit near Ouro Preto gave 52 per cent of alumina, 5 per cent of silica and 5 per cent of iron. In Rio de Janeiro deposits of bauxite occur at the base of the Itatiaia peak near Resende, at Bom Jesus de Itabapoana, Itaperuna, Macaé and Cordeiro. Deposits of bauxite also occur at Conceição do Maqui and Domingos Martins in Espirito Santo.

Phosphatic bauxite deposits are found on the Pirocaua plateau and the Trauira Island and at several points

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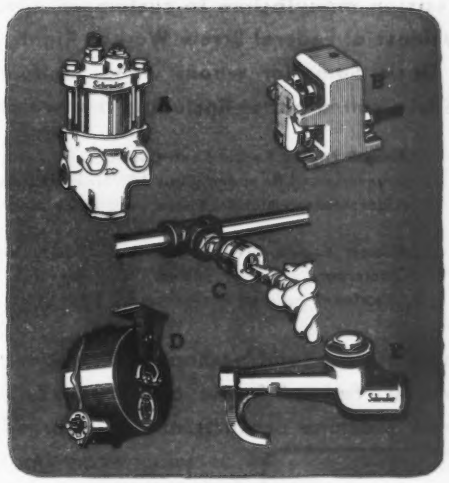

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Aircraft Engine Rocker Shaft Cap: 1" hex heat-treated SAE 3135 nickel-chromium steel. Threaded, Class 3 fit. Six holes cross-drilled 60° apart. Sharp edges broken, threads burred, and piece polished and cadmium plated.

Aircraft Engine Breather Body: 1¼" hex. No. 17ST aluminum alloy. Counterbore diameter held to .0015" tolerance. Both threads Class 3 fit. All surfaces polished except hex.

Come Victory (and perhaps a bit sooner), we'd like to produce for you. Federal Screw offers unexcelled facilities for making screw machine products and cold-forged parts of all types—to your exact requirements, and in any volume desired. That's why, in facing your peacetime production problems, you may well see the answer when you "focus on Federal Screw." Let's talk it over—now.

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ARMY E NAVY

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along the coast in Maranhão. Thes deposits contain 30 to 40 per cent o alumina (Al_2O_3) and 20 to 30 per cen of phosphate (P_2O_5). The deposits o Trauria Island above low tide leve are estimated to contain 10,000,000 o phosphatic bauxite ore. When som cheap process is discovered for util izing these ores, their exportatio would be an easy matter owing t their location. Quite recently hig grade bauxite has been discovered i the Muncipio (county) of Goiaz in th State of Goiaz and small deposits a Santo Andre and Mogy das Cruzes i São Paulo.

Deposits of flourite occur at Janua ria in Minas Geraes, Cachoeira i Baia, Santa Luzia in Paraiba, an Varginha in Parana; however, onl the Paraiba and Parana deposits ar of commercial importance.

Brazil ranks fourth among the na tions of the world in hydro-electri power resources which are estimate at 14,367,000 kw. Only a mere frac tion of these vast resources is devel oped as 907 hydro-electric power in stallations produce 989,515 kw. a present.

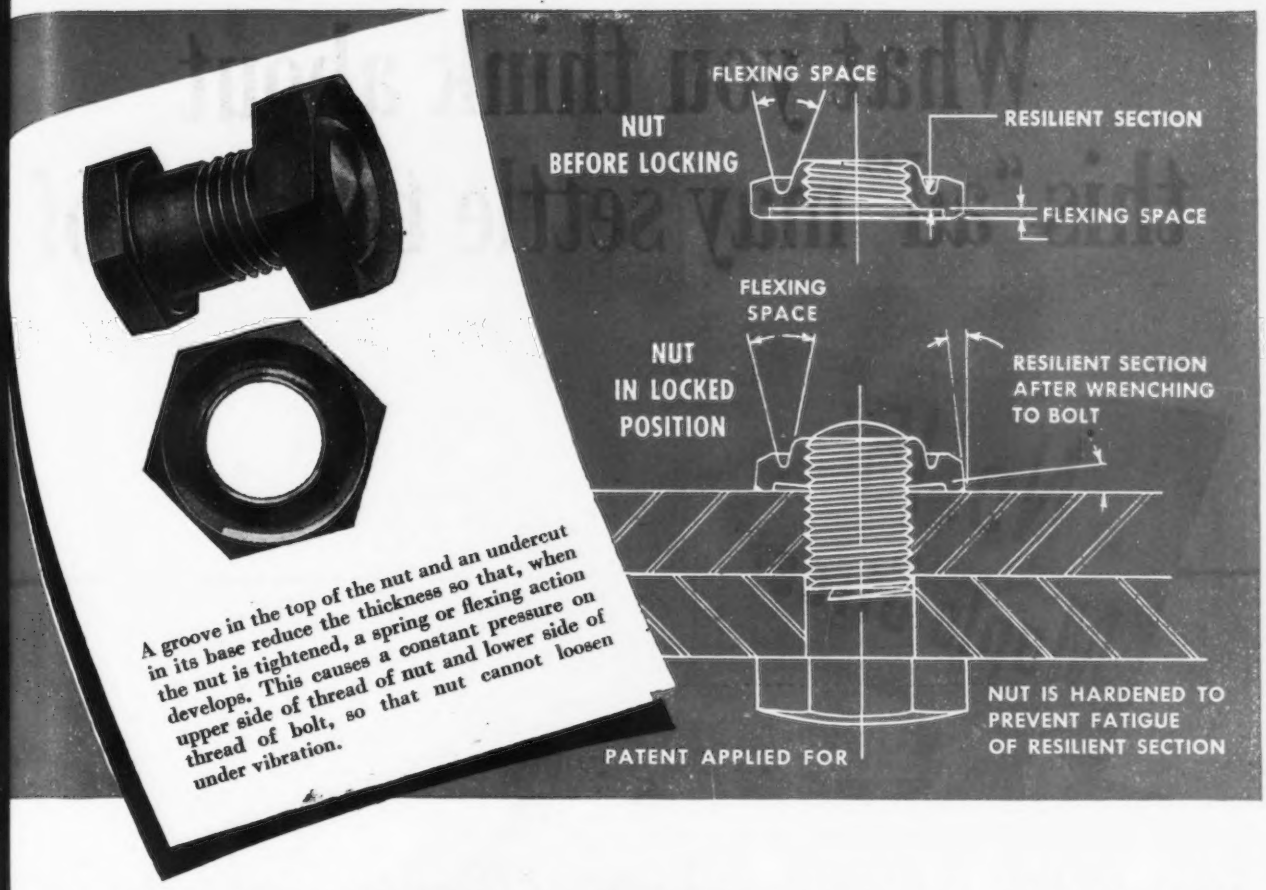
Labor is relatively abundant and very cheap everywhere. Despite the enormous expansion of all lines of in dustrial, commercial and agricultura activities and mining during the past two years, wages are still exceedingly low by American standards. The wages for common labor vary from $0.50 to $1.00 (U. S.) per day depending upon the part of the country and the char acter of work performed.

From 1930 to 1942 the average an nual importation of aluminum was 1667 metric tons. The greatest quan tity was imported in 1940 and the fol lowing table shows the quantities of aluminum products imported by Brazil during that year.

BRAZILIAN IMPORTATION OF ALUMINUM IN 1940

Kind	Quantity lbs.
Pigs and bars	2,346,592
Scrap and residue	506,591
Siliceous aluminum	497,402
Manufactured articles not specified	268,936
Sheets	138,237
Not specified	55,311
Plates	22,915
Total	3,835,984

Another important point to be considered is the policy of the Brazilian Government in regard to the development of new industries. Brazil has initiated a program of industrial expansion and no one can foretell where it will end. Even before the war Brazil was the leading industrial


FLEXING SPACE
NUT
BEFORE LOCKING
RESILIENT SECTION
FLEXING SPACE
FLEXING
SPACE
NUT
IN LOCKED
POSITION
RESILIENT SECTION
AFTER WRENCHING
TO BOLT
NUT IS HARDENED TO
PREVENT FATIGUE
OF RESILIENT SECTION
PATENT APPLIED FOR
A groove in the top of the nut and an undercut in its base reduce the thickness so that, when the nut is tightened, a spring or flexing action develops. This causes a constant pressure on upper side of thread of nut and lower side of thread of bolt, so that nut cannot loosen under vibration.

MAKE SURE *YOUR* PRODUCT WON'T HAVE THE "WOBBLES"

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The nut had to be thin, light in weight, one-piece construction. Existing types of lock nuts were too cumbersome.

They put it up to us to find the answer. We designed a new type of lock nut (patent applied for) which, when tightened, develops a *spring* or *flexing* action that eliminates the possibility of the nut loosening in action.

Appearance was a factor, too. This was improved by making the top of the bolt slightly oval, and rounding the point so as to blend in assembly with the radii of the nut.

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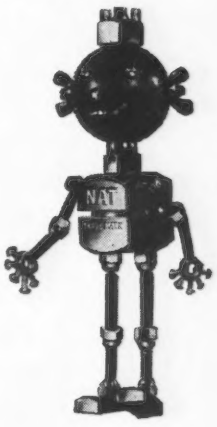

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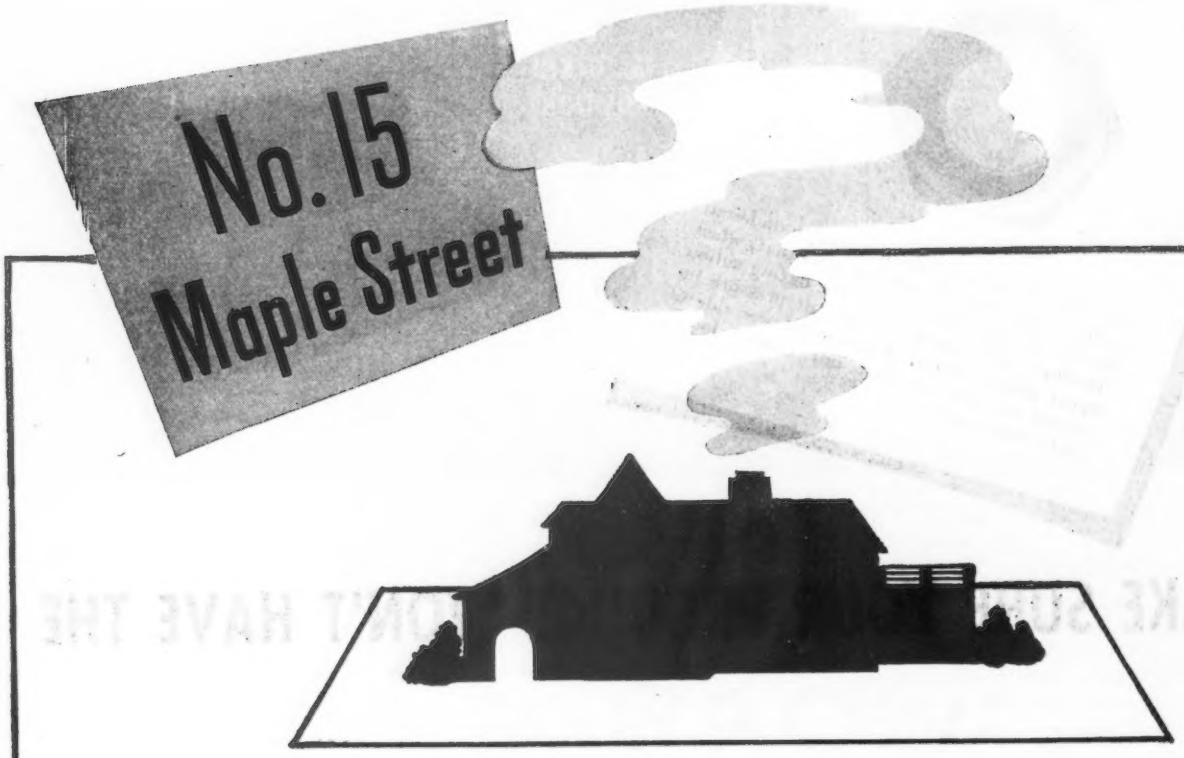
THE NATIONAL SCREW & MFG. CO., CLEVELAND 4, O.

What you think about this "ad" may settle the fate of



You have an important decision to make—you and the other men who control, in small and big ways, the policies of Industry.

It is your decision to make, whether the folks who live at the 15 Maple Streets of the country will be good customers of yours, or too poor to pay the price.

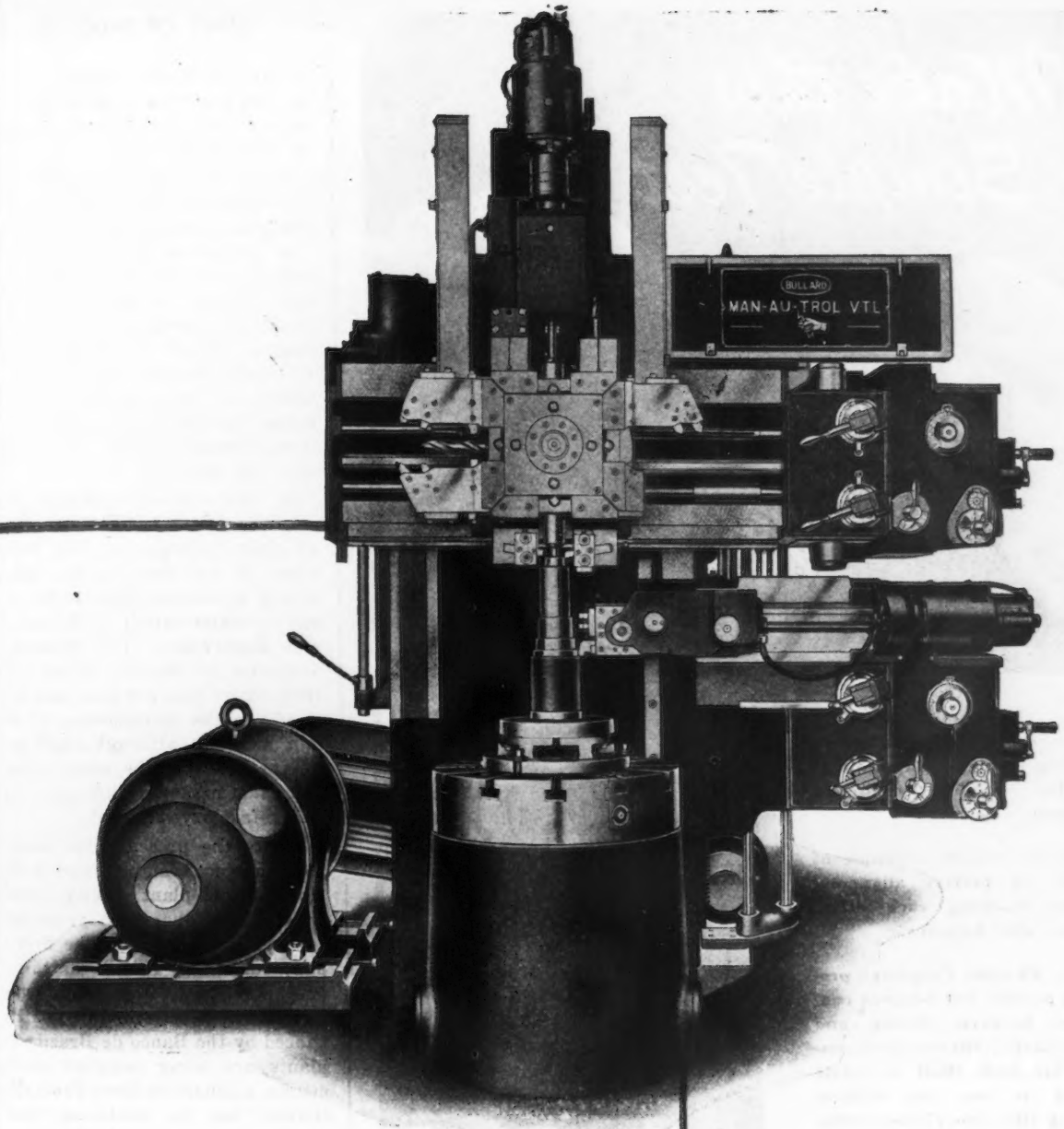
And the answer is not just how much money those folks have or will have—it's how much the goods will cost.

The history of America's industrial success—and high standard of living—is making things cost less. *Lower prices,* more than higher wages, have increased buying power.

Increased production . . . through use of better and greater-capacity tools . . . is the key to making 15 Maple Street a mighty market.

And the key to increased production in your business may very well be the new Bullard MAN-AU-TROL principle of automaticity. This new principle combines, for the first time in machine tool history, the high-speed production of special purpose machinery with the all-purpose versatility of manually-operated machines. With it you can guarantee greater profits for yourself . . . and at the same time lower prices for 15 Maple Street.

For further details about the Bullard MAN-AU-TROL V.T.L., write for Booklet A.



How the New Bullard MAN-AU-TROL V.T.L. Makes Products Cost Less

1 Focuses at a single "nerve center" the mental and muscular functions a man must follow to operate a Vertical Turret Lathe.

2 Turns out work faster than a manually-operated V. T. L. . . . with a degree of accuracy no man can match.

3 Can be changed over—in hours, not days—to machine any other piece that a manually-operated V. T. L. can handle.

4 Can be shifted to manual operation at a moment's notice.

The Bullard Company, Bridgeport 2, Connecticut.

BULLARD

CREATES *NEW METHODS*

TO MAKE MACHINES DO MORE

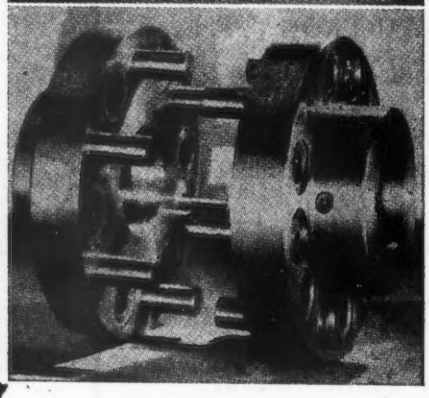
This 10-second test will quickly show you why a flexible coupling is mighty important to the life of direct-connected machines.

Just try to hold a couple of pencils in perfect alignment without touching each other, and see what happens.

Ajax Flexible Couplings provide a positive but resilient connection between driving and driven shafts. They make it possible for each shaft to rotate around its own axis without creating vibration, chatter, strain on bearings, drag, power loss, reversal of torque and other detrimental factors.

Ajax interlocking drive studs held by rubber-bushed graphited-bronze bearings assure maximum flexibility, quiet operation, and complete elimination of lubrication problems.

Make the 10-second "pencil test"—then write for Facts on Ajax Flexible Couplings.



AJAX

Flexible Coupling Co. Inc.
WESTFIELD, N. Y.
Incorporated 1920

country of South America, and d
ing the past two years industrial
pansion and production has increa
by leaps and bounds.

Being a protective tariff coun
par excellence, it is certain that
Brazilian Government will see that
new industries are adequately p
tected from foreign competition
high custom duties. In fact,
Brazilian Government, through
Federal Council of Foreign Comme
(Conselho Federal de Comercio E
terior), has revealed that all natio
industries will be adequately protec
from foreign cartels and dumpi
after the war.

In 1941 Brazil exported 14,3
metric tons of bauxite ore. Almo
all went to Argentina and Urugu
where it was used in the manufa
ture of aluminum sulphate for purif
ing the water supply of Buenos Air
and Montevideo. The internal co
sumption of bauxite is now abo
4000 metric tons per year and is us
chiefly in the manufacture of alum
num sulphate, although small quant
ties are used in the manufacture
aluminum arsenite, aluminum cemen
and refractory material.

Up to the present time aluminu
metal has not been produced in Brazi
However, one plant is being construc
ed and two others are projected fo
producing aluminum. The first com
pany formed in Brazil for this pur
pose was the Cía. Electro-Quimic
Brazileira S. A. which is partly fi
nanced by the Banco de Brazil. Thre
plants are being installed at Sara
menha, a suburb of Ouro Preto, Mina
Geraes; one for producing alumina
another for metallic aluminum, and a
third for making electrodes.

The plans for this installation were
prepared by the Dorr Co. These plans
provide for the production of ap-
proximately 10,000 tons of alumina
annually. The aluminum plant, con-
sisting of 44 furnaces, will have a
maximum annual capacity of 2500
metric tons of aluminum with 99.4 to
99.7 per cent purity. Production can
be increased to 6000 tons annually. A
hydro-electric plant of 17,000 hp. is
being installed which can also be
eventually increased to 40,000 hp. This
company possesses three deposits of
bauxite in the vicinity of Ouro Preto,
the one nearest to the plant having
reserves of ore estimated at 1,500,000
tons. It is reported that this plant
will commence operations early in
1945.

In 1940 the Cía. Brasileira de Alu-
minio, with a capital of 60,000,000

The Howell Protected Type Motor, shown, gives complete protection against dripping liquids, metal chips and other falling particles. Completely streamlined—utilizing non-breakable steel frame—malleable or steel base—cast iron end plates and cast iron, weatherproof terminal box are standard construction features. Special horizontal and vertical mountings are available.

Available in sizes 5 Hp. and smaller. Other sizes and types available up to 150 Hp.

Now, while the delivery situation in the entire motor industry is serious, the arrival of a new Howell Motor gives double satisfaction.

First, you get the satisfaction of receiving a better performing motor.

Second, you know that it will give you better service, because we have rigidly adhered to our policy of maintaining prewar standards and have steadfastly refused to compromise in quality.

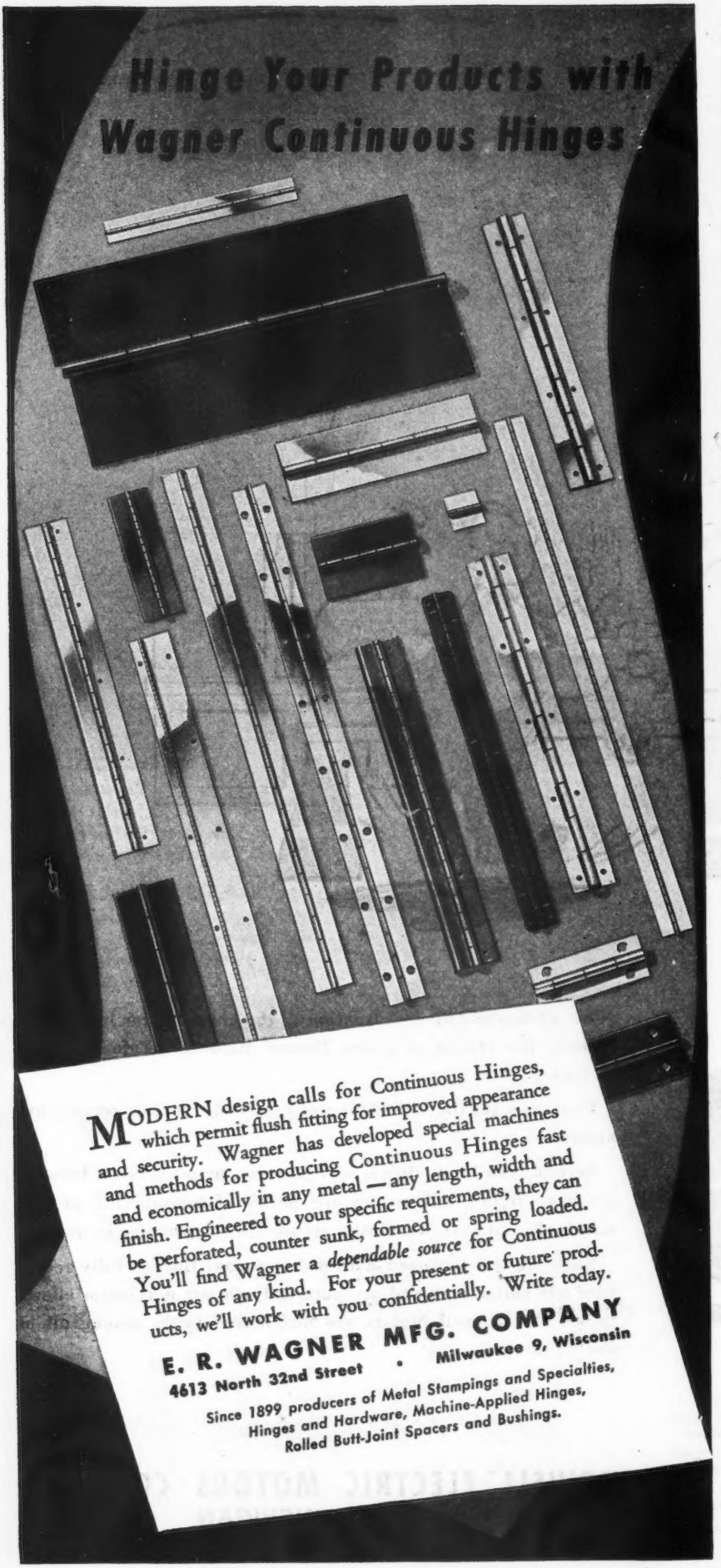
Sure, we are swamped with orders today! But we fully recognize our obligations and are putting forth our maximum efforts to see that Howell Motors are distributed fairly among all of our customers.

Buy Horsepower by

HOWELL ELECTRIC MOTORS COMPANY

HOWELL, MICHIGAN

Manufacturers of Quality Motors Since 1915


Hinge Your Products with
Wagner Continuous Hinges
MODERN design calls for Continuous Hinges, which permit flush fitting for improved appearance and security. Wagner has developed special machines and methods for producing Continuous Hinges fast and economically in any metal — any length, width and finish. Engineered to your specific requirements, they can be perforated, counter sunk, formed or spring loaded. You'll find Wagner a *dependable source* for Continuous Hinges of any kind. For your present or future products, we'll work with you confidentially. Write today.
E. R. WAGNER MFG. COMPANY
4613 North 32nd Street • Milwaukee 9, Wisconsin
Since 1899 producers of Metal Stampings and Specialties, Hinges and Hardware, Machine-Applied Hinges, Rolled Butt-Joint Spacers and Bushings.

cruzeiros ($3,000,000 U.S.) was f
ed in São Paulo for the produc
of aluminum in a plant to be er
at Rodovalho on the Sorocabana
road 50 miles from the city of
Paulo. This company has also
ranged a credit of 69,000,000 cr
ros ($3,450,000) with the Banco
Brazil. The plans of this plant w
also prepared by the Dorr Co.

Alumina will be produced by
Bayer process in a plant of 17,
metric tons annual capacity. The
itial production of the aluminum pl
will be 3600 metric tons which can
increased to 7300 tons annually by
installation of an additional line
furnaces. The excess of alumina w
be utilized in the production of alu
num sulphate. Electric power will
furnished by the São Paulo Light
Power Co., Ltd. at Cr. $0.045 per k
hr. (2½c. U. S. per 100 kw-hr.). T
company owns high-grade bauxite d
posits at Poços de Caldas, Minas G
raes, whose reserves are estimated
5,000,000 tons. These deposits a
situated 197 miles by rail from t
plant. The priority for the purcha
of machinery in the United Stat
last year was canceled. Perhaps t
Defense Plant Corp. will be able
dispose of some of its excess equi
ment and machinery to this compan

Another company, the Cía. Indu
trial Brasil Aluminio S. A., has su
mitted plants to the National Counc
of Mines and Metallurgy for th
manufacture of aluminum at Campo
Rio de Janeiro. The capital of th
company is 33,000,000 cruzeiros ($1
350,000 U. S.) which is to be raise
by public subscription. The plan
prepared by the Arthur G. McKee C
of Cleveland, Ohio, provide for a year
ly production of 6000 tons of alumi
num. This company plans to utiliz
the bauxite deposits situated in th
States of Rio de Janeiro and Espirit
Santo whose reserves have been cal
culated at 1,152,000 tons by mining
engineers of the Brazilian Bureau o
Mines (Departamento Nacional da
Produção Mineral).

An average analysis of 50 samples
of bauxite from one of the deposits
(Fazenda Lajinha) revealed 59 per
cent of alumina, 7.8 per cent of ferric
oxide and 7.8 per cent of silica—the
percentage of the latter varying from
2 to 13 per cent. The McKee engineers
admit the possibility of obtaining
ores with 59.5 per cent of alumina, 3.5
per cent of ferric oxide and 6 per
cent of silica by careful selection.
However, they were careful to point
out that the cost of production of

All over the Home Front

ON REPAIR AND MAINTENANCE WORK

P&H HARMOMANG

A Proved Electrode For *high* Resistance to Impact, Abrasion and Wear

Harmomang is an electrode with the work-hardening qualities which suit it especially for the building up or hard surfacing of manganese and carbon steels.

It is a coated moly-manganese electrode with hardness range up to 43-46 Rockwell "C". It can be used on AC, or for either straight or reverse polarity on DC.

Harmomang is the ideal electrode to use wherever you need protection against both impact and abrasion. For example: for hard surfacing dipper lips, dipper teeth, bucket runners, rock crushers, railway frogs or wherever longer life is desired for parts made of manganese or carbon steels.

Write direct for full information and procedures or see your P&H representative.

A COMPLETE ARC WELDING SERVICE

50 YEARS OF SERVICE — P&H Alloy ELECTRODES

General Offices:
4401 W. National Ave., Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION
WELDING ELECTRODES - MOTORS - HOISTS - P&H - ELECTRIC CRANES - ARC WELDERS - EXCAVATORS

Canadian Distribution: The Canadian Fairbanks-Morse Co., Ltd.

RUST CAN'T TOUCH TECTYL PROTECTED METAL

The Thin Film SEALS Out Moisture

In either fresh or salt water atmospheres, metal surfaces covered with one quickly applied coat of Tectyl are protected for as long as two years. The Tectyl film is transparent, so you can inspect the metal at any time. It's easy to put on by spraying, dipping, brushing, or flushing, and easy to take off with kerosene.

Five Specialized Types

Whether your rust-prevention problem is small or enormous, whether you need protection for long storage or for short periods during production operations, WHATEVER your need may be—there's a special Tectyl product that will save you money and man-hours. Tectyl gives you economical, *positive* protection—write today, telling us your corrosion problem, and we'll send you our Tectyl bulletin with complete application data.

TECTYL STOPS RUST

VALVOLINE OIL COMPANY

Finest Lubricating Oils Since 1866

468 Culvert Street Cincinnati 2, Ohio

Refinery at Butler, Pennsylvania General Offices, Cincinnati, Ohio

New York - Atlanta - Detroit - Chicago - Los Angeles - Vancouver - Washington, D.C.

metallic aluminum would be increas 0.07c. (U. S.) per lb. for each ad tional per cent of silica in the or

The 15,000 kw-hr. of power requir will be obtained from a hydro-elect plant at Macabu now being constru ed. The incorporators of the compa hope to secure electric power at ($0.075 per kw-hr. (3¾c. U. S. p 100 kw-hr.). The 25,500 tons bauxite required will be transport by the Lepoldina Railroad a distan of 81 miles to the plant.

If the plants now under constru tion and projected are finally put production, it is clearly evident th the aluminum produced will be in e cess of the normal requirements the country by about 11,000 tons a nually. If the production costs pro to be less than in the United State the excess can be exported to oth South American countries after t war.

The Cía. Brasileira de Alumin estimate that they can produce alum num at 5 cruzeiros per kilo or abo 11 1/3c. per lb. If all of the Brazili aluminum plants can produce alum num profitably at this figure it ca probably be exported. Furthermor there are great possibilities for i creasing the domestic consumption aluminum.

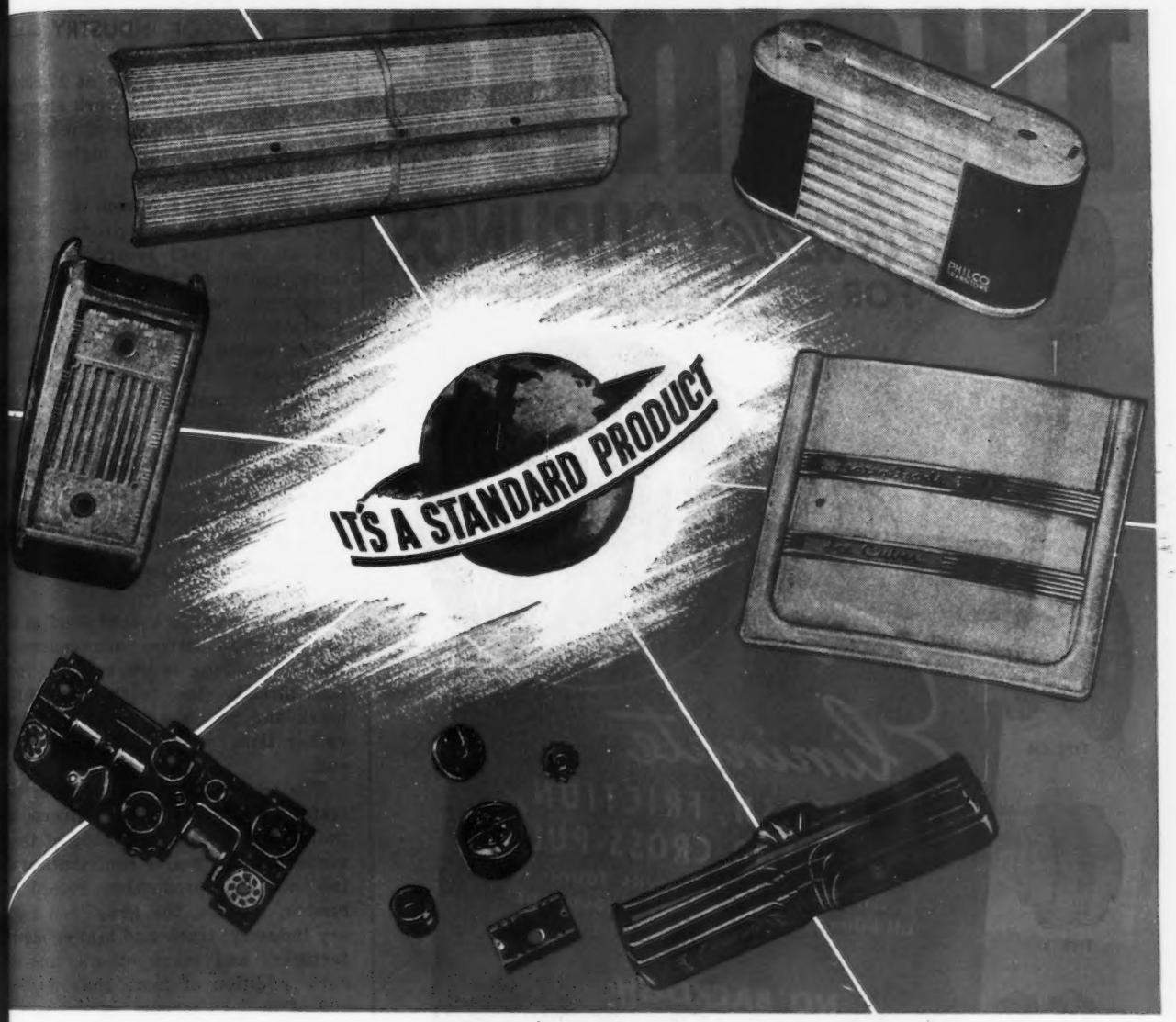
The prewar per capita consumptio of this metal was approximately 4 grams in Brazil as compared to 11 grams in Argentina and 350 grams i European countries. If the presen standard of living of the Brazilia population is maintained in the pos war period, it is probable that th internal consumption of aluminum wil increase to at least 5000 metric ton annually.

Alabama Produces 19 Million Tons Of Coal in 194

Birmingham

• • • In 1944 industrial activity her saw an increase in the artillery am munition field over 1943, steel produc tion at Tennessee and Republic fo vessels built for military use i southern yards, cars for narrow gage railroads in battle areas in th Pullman plant at Bessemer, plus standards cars, rails, coal, tanks drums and other containers for the Armed Forces.

Alabama has produced substan tially in excess of 19,000,000 tons o coal, it will be shown on final com pilation of figures, the total through



MOLDING A *Reputation*

Standard Products' reputation is an inherent part of every plastic item we fabricate, our reputation in molding plastics is not accidental—but the result of years of experience, strenuous application to detail and an honest desire to produce the best at the lowest possible cost.

The Standard Products Co. modern press equipment plus new techniques in molding all combine to assure you that the Standard Products Co. will give you the utmost in molding service . . . efficiently and economically.

The Plastics Division of Standard Products is equipped to mold any plastic part, large or small, by injection, compression, extrusion, transfer or jet molding processes.

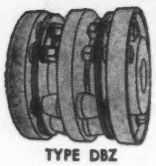
The facilities of the Standard Products' Research Laboratory and Engineering Departments are at your service. Write the Standard Products Co. if you have a plastic molding problem.

THE STANDARD PRODUCTS COMPANY

Main Offices and Research Laboratory

505 Boulevard Bldg. • Woodward Ave. at E. Grand Blvd. • Detroit 2, Michigan

THOMAS
Flexible COUPLINGS
FOR *any* SPEED OR SERVICE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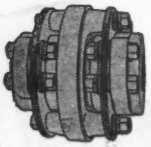
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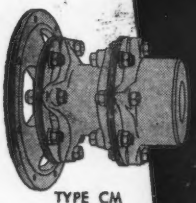
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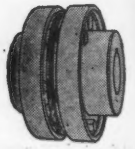
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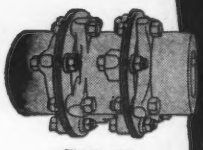
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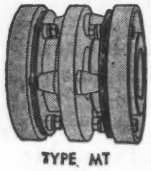
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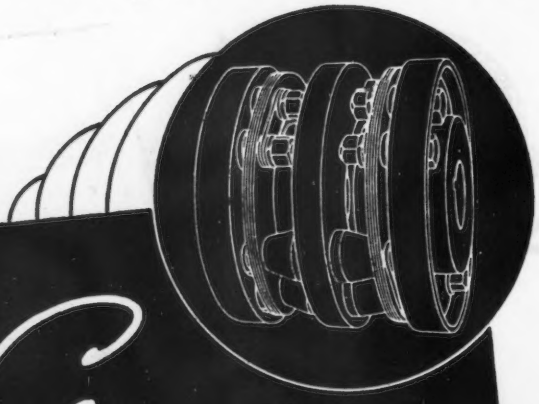


Eliminate

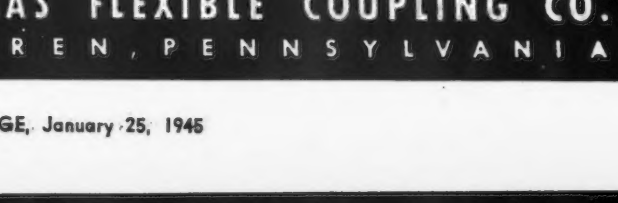
BACKLASH, FRICTION, WEAR AND CROSS-PULL

.....the 4 destructive evils found in all other types and makes of couplings.

NO BACKLASH
NO WEAR
NO LUBRICATION
NO THRUST
FREE END FLOAT

These are the five essential features of Thomas Flexible Couplings that insure a permanent care-free installation.

WRITE FOR COMPLETE ENGINEERING CATALOG



TYPE DBZ-D

THE THOMAS PRINCIPLE ELIMINATES CHAINS, SPUR GEARS and other VIBRATING MAKESHIFTS

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

November having stood at 17,859,0 tons despite scattered work stoppag and a considerable loss of men to t armed services and to higher payi industries.

Tennessee Coal, Iron & Railro Co.'s by-product coke production be its all-time 1942 record by 22 p cent; the 48-in. hot rolled strip mi producing material for tin cans a containers so essential to the w effort, bested its all-time 1941 reco by 10 per cent; open hearth and ste foundry operations will better th all-time 1942 record by about 8 p cent, and blast furnace products wi go ahead of 1942, the record yea thus far, by 4 per cent.

Alabama red ore production wi show a great change from 1943, clos to 6,500,000 tons being indicated fo the year.

The new year is booked solid as fa as heavy industries are concerne Most reassuring is the railroad busi ness already close to the $20,000,00 mark and which would be expedite rather than "cut back" by the war' end.

The same story is true over th state. President J. B. Converse, o the Alabama State Chamber of Com merce, reports major contributions t the nation's production record by lumber, textiles, the gray iron foun dry industry, truck and trailer manu facturers and many others, and re ports addition of more than $4,000,000 of modern machinery during the year to further strengthen productive capacity.

Great Lakes Tonnage Total Is New Record

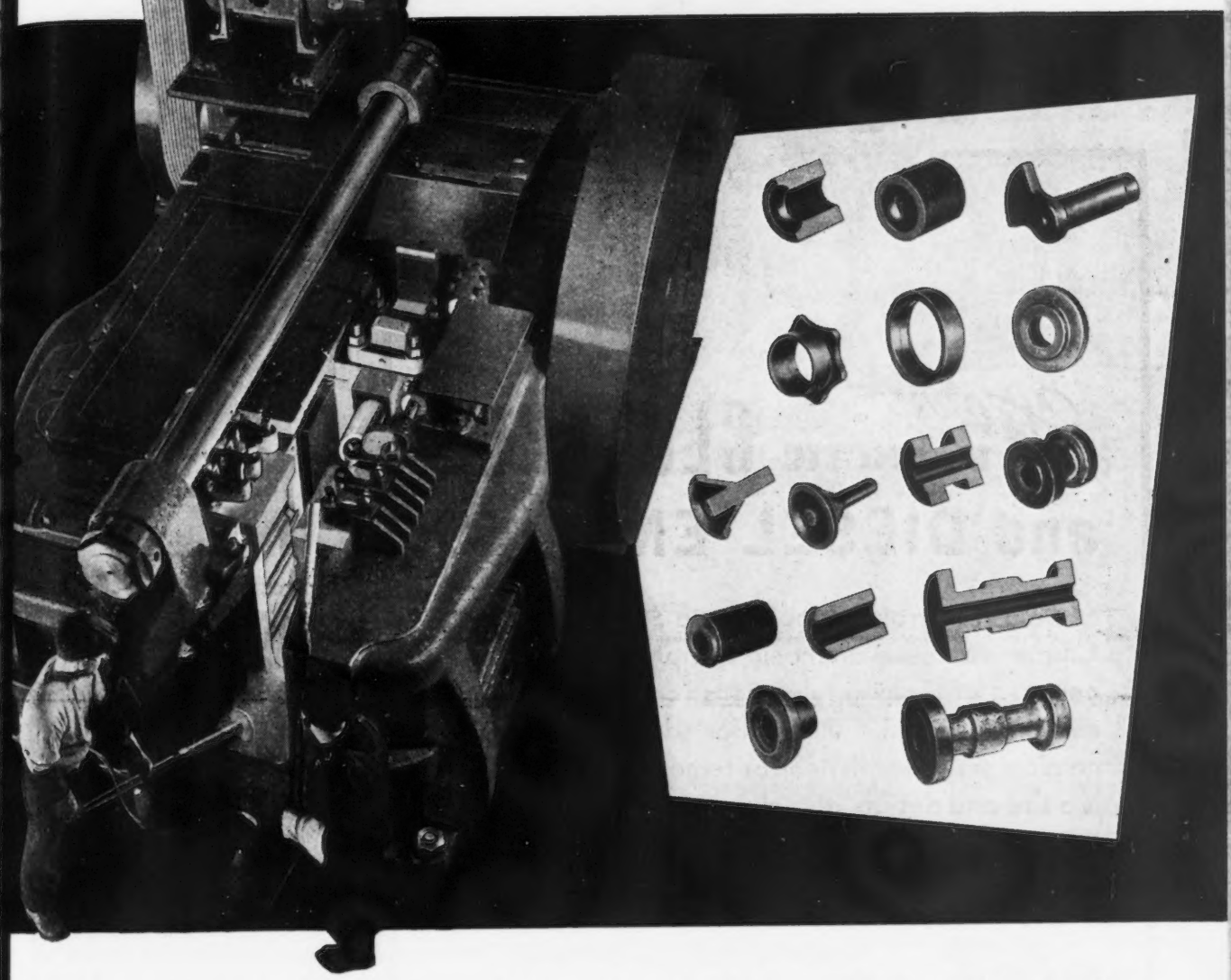
Cleveland

• • • Coarse freight commerce on the Great Lakes hit the high mark in its history during 1944 when totals reached 184,155,384 net tons, according to statistics compiled by the Lake Carriers' Association.

Accomplished in a sailing season that was nine days shorter than the one in 1942, which was the former high, the new record represents two and one-half times the total of war cargoes carried by America's ocean-going merchant fleet.

In 1944, iron ore and limestone slipped to third highest in history, but record coal and grain tonnages combined to produce the over-all record. Of the record, 58,747,203 tons of bituminous coal shipped last year, 53,981,331 tons were loaded into the ships at Lake Erie ports. Nearest approach

FORGING AHEAD



★ In this period of unprecedented demand for forging production, much obsolete and inefficient forging equipment has, of necessity, been kept in operation to supplement the production of the modern machines in meeting the abnormal requirements.

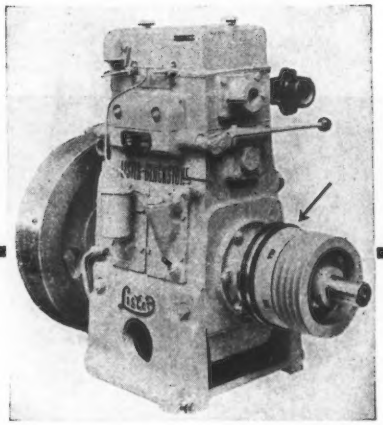
In looking toward the future, when production for war will be a thing of the past and keen competition for peace time business will be paramount, we foresee the successful operators then as the ones who have equipped themselves with the most modern and highly efficient forging machinery and who have gained thorough experience in the high production operation of that machinery.

Ajax "Air Clutch" Forging Machines, built on the basis of mechanical soundness, provide the most advanced design of horizontal forging machines yet developed. These machines with their lower operating costs, higher production speeds and greater accuracy, so outstanding in the production of forgings for war now, will be invaluable in that era of forging ahead.

WRITE FOR BULLETIN No. 65-B

THE
AJAX
MANUFACTURING
COMPANY

EUCLID BRANCH P. O., CLEVELAND 17, OHIO
621 MARQUETTE BUILDING • CHICAGO 3, ILLINOIS



Stearns MAGNETIC CLUTCHES and DIESEL ENGINES

Note the arrow! It points to a Stearns Magnetic Clutch in a Diesel-ammonia compressor hookup . . . only one of many applications for magnetic transmission devices. They offer dependable, economical service with near or remote control. There is a size and design, also clutch and brake combination, to suit your requirement . . . extreme flexibility, smooth acceleration, fast stop. Will give you definite savings in operating costs and maintenance expense.

OUR BULLETIN 225, ABOVE, IS FULL OF INTERESTING INFORMATION ON THE SUBJECT. WRITE FOR IT.

Consult us on your transmission problems, in your plant or product. We invite your inquiry. No obligation. We are pioneers in the development of magnetic friction devices of all kinds.

Pulleys—Drums
Magnets of all kinds
Separators—Brakes

MAGNETIC MFG. CO.

635 S. 28th St.
Milwaukee 4, Wis.

to those totals were 52,566,163 to shipped, 49,733,234 tons loaded fr these same ports in 1941.

Movement of anthracite exceed 1,000,000 tons in 1944 for the first ti since 1930.

A potent factor in 1944 was the fu season use of 16 new ships, faster a larger, and indicated in the breakdo of the iron ore traffic which show 7500 cargoes shipped by Americ ports averaged 10,718 gross tons, co pared to 8,078 cargoes, averaging 1 379 long tons in 1943.

Commodity totals, net tons:

	1944	1943	1942
Ore	90,911,003	94,533,434	103,125,9
Bituminous coal	58,747,203	51,120,475	51,623,8
Anthracite coal	1,416,127	848,984	909,9
Grain	16,228,880	11,810,116	8,501,5
Stone	16,852,171	17,339,575	18,570,0
	184,155,384	175,652,684	182,731,4

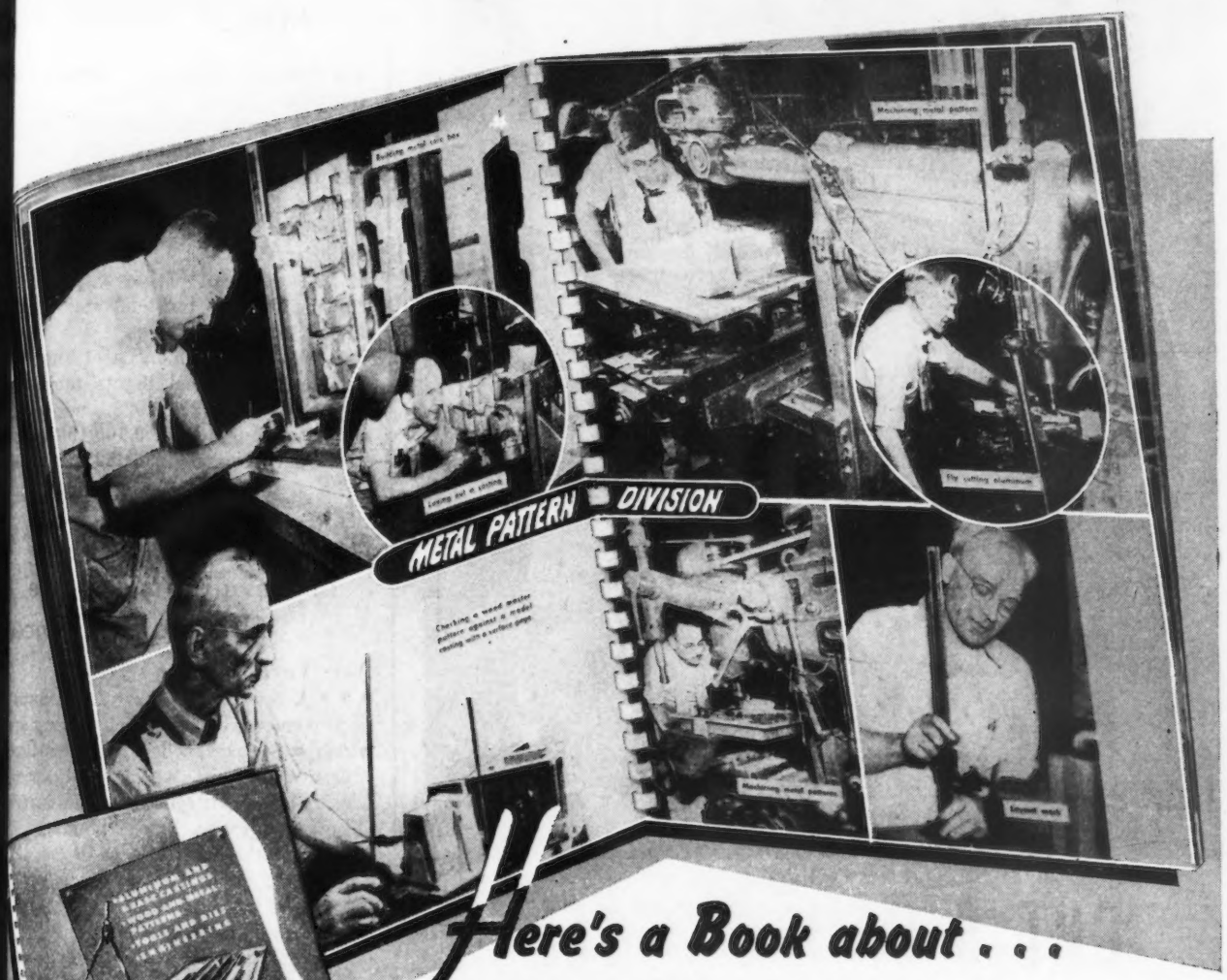
Canadian Production Declines in Novembe

Toronto

• • • Production of iron and steel i Canada for November showed a de cline from the month immediately preceding, while for the 11 month ending with November gains were registered over the corresponding peri od for last year. For November pig iron production totalled 146,972 net tons, compared with 154,119 tons in October and 142,249 tons in Novem ber, 1943. For the month under review output included 121,691 tons of basic iron of which 117,679 tons were for further use of producing firms and 4013 tons for sale; 13,408 tons of foundry iron, all for sale and 11,873 tons of malleable all for sale.

For the 11 months ending Nov. 30, pig iron output totalled 1,713,476 net tons, compared with 1,621,009 tons in the previous year and 1,810,633 tons, the alltime high record, made in the first 11 months of 1942. During November 8 of 11 blast furnaces in Canada were blowing, and output was at a rate of 63.6 per cent of total capacity.

Production of ferroalloys in November amounted to 15,280 net tons as compared with 15,631 tons in the previous month and 16,169 tons in November, 1943. The month's output included ferrosilicon, silicomanganese, ferromanganese, spiegeleisen, silicospiegel, ferrochrome, chrome-X and ferrophosphorous. For the 11 months production of ferroalloys totalled 170,037 net tons against 201,



Here's a Book about . . .

THE RIGHT MEN— IN THE RIGHT PLANT— WITH THE RIGHT EQUIPMENT— and the Right Answers for YOU!

TRAINED, experienced, resourceful production men—a spacious, well-lighted, thoroughly modern plant—up-to-the-minute equipment—that's the Acme setup and it goes far toward explaining why Acme does a superior job.

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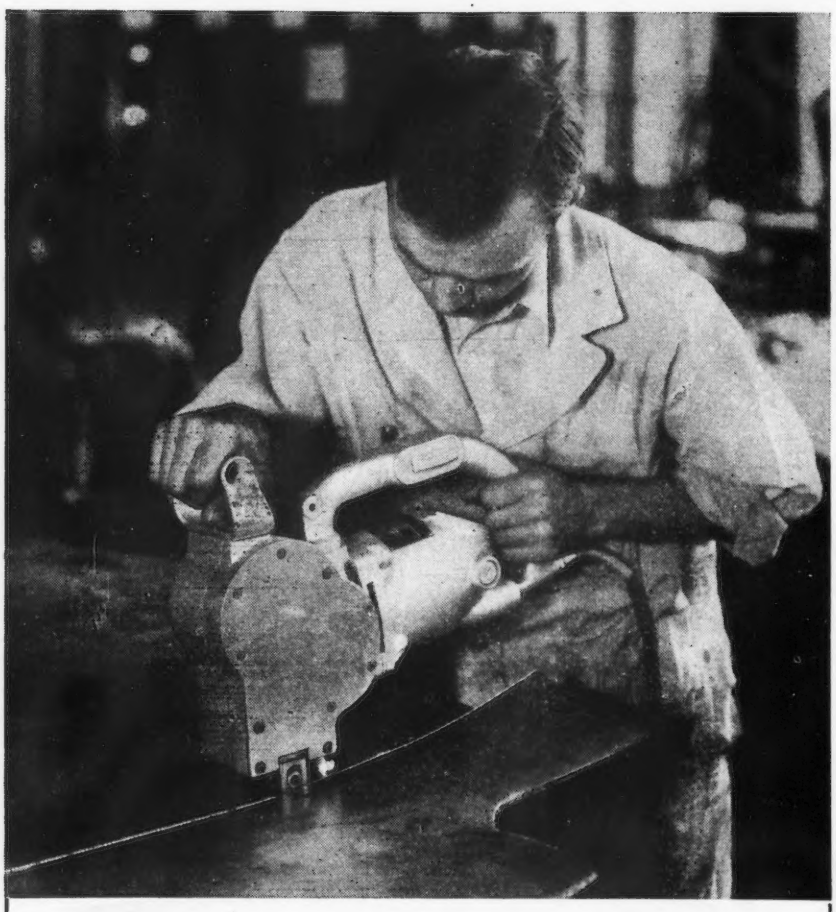

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649 tons last year and 194,069 tons in 1942.

Steel ingots and castings production in November amounted to 268,923 net tons, compared with 275,52 tons in October and 259,444 tons in November a year ago. For the month under review output was at a rate of 89.8 per cent of capacity and included 256,504 tons of ingots and 12,419 tons of castings.

In the first 11 months of the year production of steel ingots and castings totalled 2,780,928 net tons which compares with 2,769,156 in the 1943 period and 2,851,527 tons in 1942.

Describes Steelmaking Improvements Because Of War Experiences

New York

• • • A few of the many substantial improvements in the steel-making art which were learned under wartime pressure and will live on in the post-war goods of everyday civilians were described recently before members of the Brooklyn Institute of Arts and Sciences by Dr. J. B. Austin, assistant director of U. S. Steel Corp.'s research laboratory in Kearny, N. J.

Among the new metallurgical advances which may be translated immediately from the rude uses of war to the arts of peace, Dr. Austin listed as typical: (1) The employment of a minute percentage of boron to enhance the hardenability of steel; (2) new knowledge, experience, and steel compositions for using steel at elevated temperatures, as in oil refineries, chemical processes, steam power plants, and in superchargers for the development of a new turbine prime mover; (3) the use of welding as a means of fabrication on many grades of steel which were considered hardly weldable in prewar times, and (4) the continued use of at least some of the so-called National Emergency low-alloy constructional steels, which were developed in pressing circumstances, to help conserve the supply of alloying elements and make the most effective use of the alloy content of existing steel scrap. These new steels, Dr. Austin explained, offer multi-purpose advantages which are easily demonstrable over the unnecessarily large number of "custom made" steels provided before the war.

"Experience gained in war will also lead to improved methods of manufacture of products made from steel," Dr. Austin predicted. "It seems certain,

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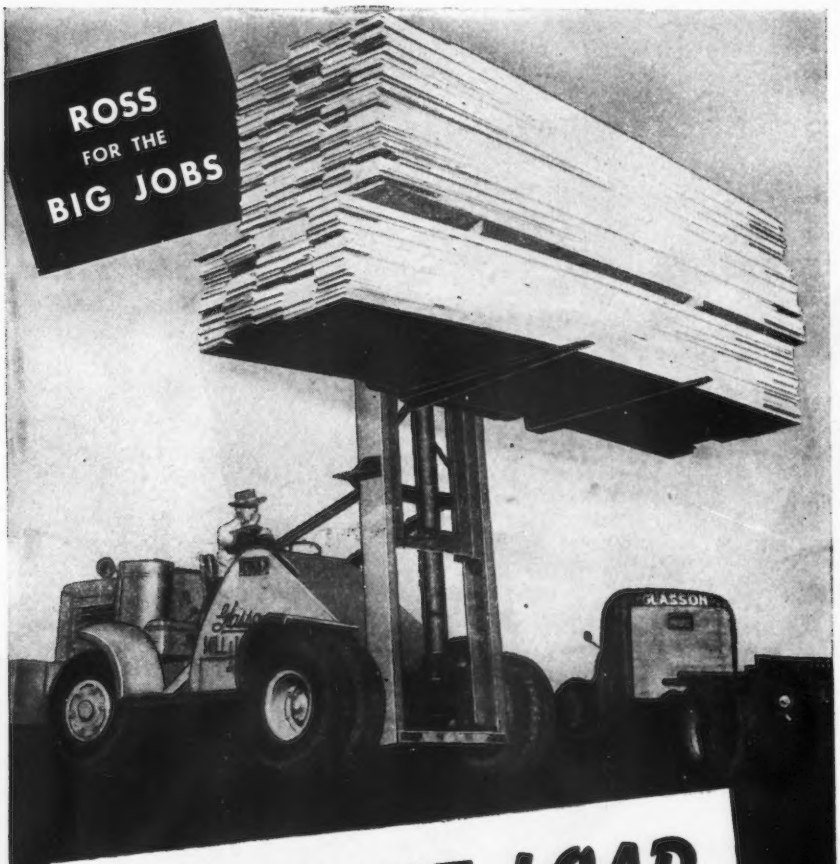

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for example, that many parts hither machined out of solid stock will formed by pressing sheet and strip by welding smaller components. Advantages may also be expected in the design of many articles made from steel."

Among the improvements, Dr. Austin described the so-called "powder metallurgy," of which he predicts much more than at present will certainly be heard. In this practice iron is formed much as plastic materials are shaped; that is, a carefully prepared powder is pressed into a mold and then heated to a high temperature to sinter it, thus producing many products.

The postwar market, Dr. Austin predicted, will offer a golden opportunity for fabricated housing units and whole fabricated houses to come into their own. "The mechanical problem of prefabrication does not offer insurmountable difficulties," he asserted, "since a house is essentially far less intricate than an automobile. The importance of this development to the steel industry will be far-reaching because of the various ways in which steel parts can be economically utilized. One interesting development, by no means new but greatly accelerated by the war, is the increased use of light gage structural steels. Developed for civilian use, this type of construction offers increased advantages of fire protection, greater strength and reduced maintenance cost."

Shell Steel Loss Ends as Strikers Go Back to Work

Cleveland

• • • **Loss of 1900** tons of shell steel a day, due to the closing of the 12-in. mill of the Corrigan-McKinney plant of the Republic Steel Corp., ended recently when the mill was put back into operation and members of the United Steel Workers of America (CIO) went back to their jobs.

The shutdown started Jan. 8 as a result of a disagreement between the company and the union as to the necessity and advisability of reducing the strander crew by two men on each turn because of installation of automatic turn-ups.

At this point, William F. Donovan, district director of the union, issued the following statement: "The men have agreed to go back to work and do what they can do on the job, providing the company will give them a

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Production records of Barium's customers, from large and small forge shops, testify to the finer performance and economies of BARIUM Die Steel.

Your inquiries concerning BARIUM Die Steel will receive prompt attention. One of our representatives will be glad to call upon request. Write or wire...

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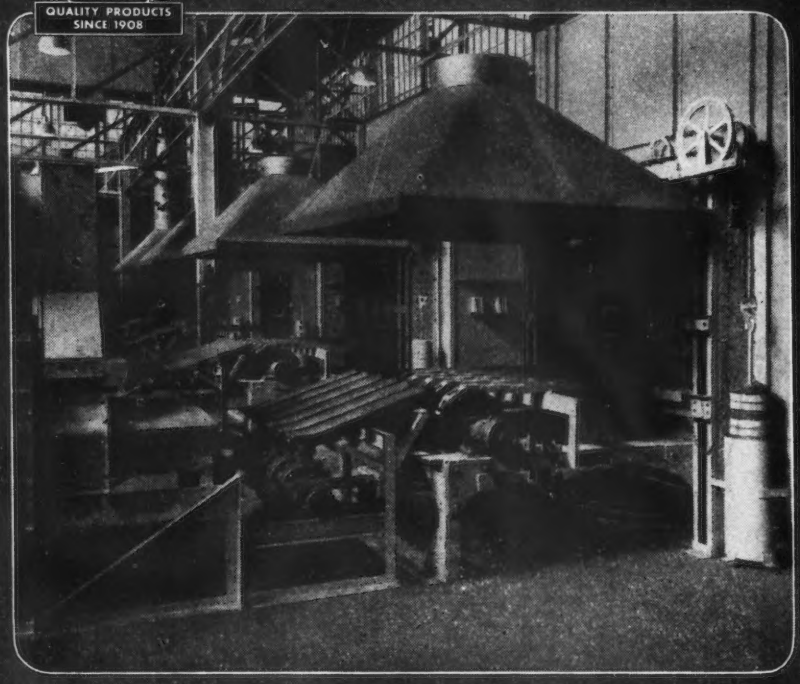

Illustration: Discharge ends of convection type draw furnaces where the heat treatment of heavy artillery shells is completed after the shells are hardened and quenched.

The continuous furnace is a production line machine which not only eliminates costly materials handling, but lends itself to accurate temperature control as well. Uniform physical properties are obtained in the process. Ductility and elongation are held to specified limits.

Continuous automatic operation throughout each of the four complete units requires a minimum of manpower.

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R-S Furnaces of Distinction

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R-S PRODUCTS CORPORATION

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BUY WAR BONDS

full and steady run of steel on the line and provided that a man from the union's research department is present when the mill starts up to make observations to determine whether the mill is under-manned."

According to company officials, the strike began following the starting of a new heating furnace which was put in operation Jan. 5, after which the men demanded rate increases. They were asked to wait until the furnace had been in operation long enough to establish its production rate. This was in accordance with the normal grievance procedure and with the union contract. Instead, the men on the 12-in. mill struck Monday and the 10-in. mill followed.

An additional issue, company officials said, was brought in by the union which protests the transfer to other jobs in the plant of two of the men who are no longer needed on the 12-in. mill because of automatic machinery installed in connection with the new furnace.

Republic's 12-in. mill here, one of a small number in the country capable of producing this type of steel, recently had its production capacity boosted 10,000 tons a month by the addition of a new furnace and by other mechanical improvements. Production is now at the rate of 57 tons per hr.

According to C. M. White, vice-president of operations, the most critical manpower situation is in the strip mill, which at its peak was turning out 76,000 tons of ship plates a month, although it was originally designed to produce only 10,000 tons a month.

It was devoted exclusively to ship plate, fewer men were needed at the mill and the working force there dropped from 14,000 to 730. Now the mill has a key role in the production of automotive steel sheets, and black sheets for tinning in accordance with the current demand for lighter material for guns, trucks, Niessen huts and other war materiel.

Association Elects New Heads

Detroit

• • • F. C. Crawford, president of Thompson Products, Inc., Cleveland, has been elected president of the Automotive and Aviation Parts Manufacturers, Inc. John Airey, president of King-Seeley Corp., Ann Arbor, was elected vice-president; and J. L. Myers, executive vice-president of Cleveland Graphite Bronze Co., was named secretary-treasurer.

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The correct rope for your equipment

"For maximum wire rope satisfaction and service, give me Macwhyte PREformed every time."
"Here's why!"

- ***"FIRST, Macwhyte PREformed lasts longer.***

  I've found that it outwears non-PREformed ropes by a big margin. That's because internal friction and fatigue are virtually eliminated. In Macwhyte PREformed, each wire and strand are shaped to lie *naturally* in the rope."

- ***"SECOND, it's more economical.***

  Because of the extra-long service Macwhyte PREformed gives, I get lower cost per load carried. My records show it actually saves me money!"

- ***"THIRD, it means fewer shut-downs.***

  That's mighty important to me, because I need every man-hour possible to maintain production schedules."

- ***"FOURTH, it's easy to install.***

  Macwhyte PREformed does not kink during unreeling. It is extremely flexible and can be put on equipment *fast*, thus saving precious time."

- ***"FIFTH, it is safer to handle.***

  Macwhyte PREformed can be cut without seizing. Broken wires stay in place, do not wicker out to injure workmen's hands."

- ***"SIXTH, Macwhyte PREformed has Internal Lubrication:***

  Heavy lubricant improves the sliding action of wires as they move in bending around sheaves and drums. In many cases the inside wires are in good condition after the outside wires are seriously worn."

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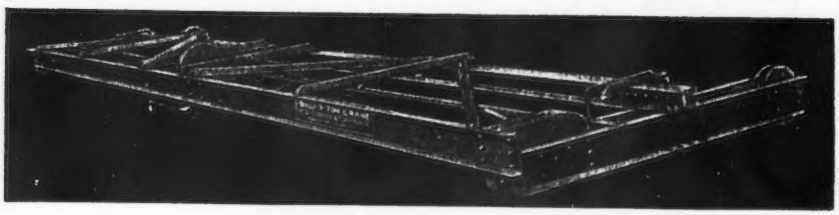

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British Reacting To Continued Criticism From American Pres

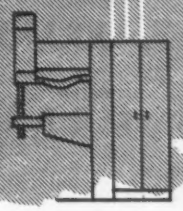
New York

• • • Because of the widespread in terest and discussion of American British relations which came to a high pitch following comments in *The Economist*, London conservative weekly, THE IRON AGE is reprinting the following complete story as it appeared in *The Economist* Dec. 30, 1944 issue.

The British have been having a bad time in the United States of recent weeks. The outburst of criticism and abuse has been one of the most violent and sustained of the war years. The trouble started with British policy in Italy, where the much-misunderstood (and quite inadequately explained) ban on Count Sforza brought a moralizing rebuke from the State Department. The fat was really in the fire with the outbreak of fighting in Greece, and the Prime Minister's latest speech on Poland redoubled the fury. Those who blamed the Greek policy for being too anti-Russian, and saw in it a sinister proof of British "balance of power" policy, blamed the Polish policy for being too pro-Russian and too clear a sign of a sinister "spheres of influence" bargain. With these the main occasions of offending, the old familiar complaints have been added in full measure. Britain is stealing a march on the poor repressed American exporter. Britain has no intention of fighting the Japanese. Britain is not really fighting in Europe—it is even a subject of complaint that Rundstedt did not select the British-held front for his break-through. Britain is imperialist, reactionary, selfish, exclusive, restrictive. Britons spend half their time imitating Lord North and the other half of their time aping Dr. Schacht.

All this is painfully familiar. The only novelty in the present epidemic is the evidence that the American Government itself—or at least some parts of it—is more anxious to provide ammunition for the malcontents than to correct their wild misstatements. While the outbreak lasts there is nothing that the British representatives in American can do about it. But each time there is one of these outbursts it becomes harder simply to grin and bear it. In the sixth year of an exhausting war, in which the British people have received many kicks and lost all their ha'pence, not much tail twisting can be borne in silence. If

"THREE-PHASE" resistance welding



what it means

Spot, seam or flash welding steel in heavy gauges can now be accomplished on a balanced three phase load. This revolutionary achievement in power efficiency overcomes many limitations encountered with a.c. single phase welders. These are: disturbance to the usual three-phase supply by the unbalanced load, the heavy reactive load which results in low power factor, and the high power demand caused by secondary resistance. The Sciaky "THREE-PHASE" system *reduces cost of power installation and cost of operation* by providing:

1. ***A balanced three-phase load***
2. ***Operation at near unity power factor (less KVA)***
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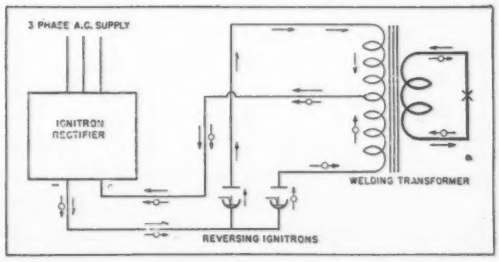
how it operates



As shown in the schematic diagram, all three phases of the a.c. line current are converted by an ignitron type rectifier to d.c. The welding transformer is of the standard single-phase type, but has a center-tapped primary. The d.c. current is fed to the primary through a system of two ignitron tubes which fire alternately and allow the current to flow through only one winding at a time. Thus, while the direction of the current supplied by the rectifier is always the same, since it flows in only one winding at a time during successive impulses, *it will flow in opposite directions in the primary.* Therefore, the induced welding current in the secondary is a continuous alternating impulse of low frequency . . . *of ideal wave shape and magnitude.*

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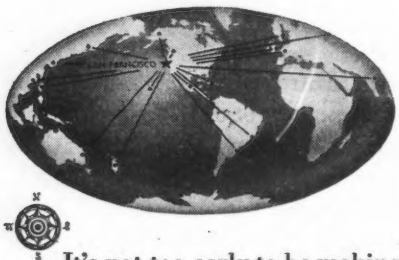

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only to act as a safety valve, and prevent worse happening, some very plain speaking is long overdue, and perhaps a journal whose general approach to the problems of the world is so obviously Americanophil as is that of *The Economist* is the right place for the plain speaking to appear.

Hypocrisy is a common Anglo-Saxon failing—indeed, a failing of the rich and comfortable all over the world—and the British have many times made themselves cordially disliked by it. But that does not exempt them from feeling resentment when they are the objects of other people's hypocrisy. What makes the American criticisms so intolerable is not merely that they are unjust, but that they come from a source that has done so little to earn the right to postures of superiority. To be told by anyone that the British people are slacking in their war effort would be insufferable enough to a people struggling through their sixth winter of black-out and blockade and bombs, of queues and rations and coldness—but when the criticism comes from a nation that was practising Cash-and-Carry during the Battle of Britain, whose consumption has risen through the war years, which is still without a national service act—then it is not to be borne. The latest turn taken by criticism is that British policy in Greece and Poland has killed the Atlantic Charter—and this comes from the country where both political parties were ready to promise, in the hope of securing the electoral vote of New York State, that they would force a wholly Jewish State on the Arab majority in Palestine. Or, it is complained that the British are seeking a sphere of influence—when anybody with any knowledge of facts or appreciation of probabilities can see for himself that nothing is being, or could be, sought by the British half as dominating and exclusive as the sphere of influence created by the Monroe Doctrine. Again, criticism of the British for playing "balance of power politics" (whatever that may mean) comes from the very mouths that call for the annexation by the United States of all the convenient naval bases in both oceans. It is complained that the British return neither gratitude nor promise of repayment for Lend-Lease—yet the Lend-Lease Act itself declares that nothing shall be given that is not necessary for the defence of the United States.

How can the ordinary Englishman be expected to listen without mockery

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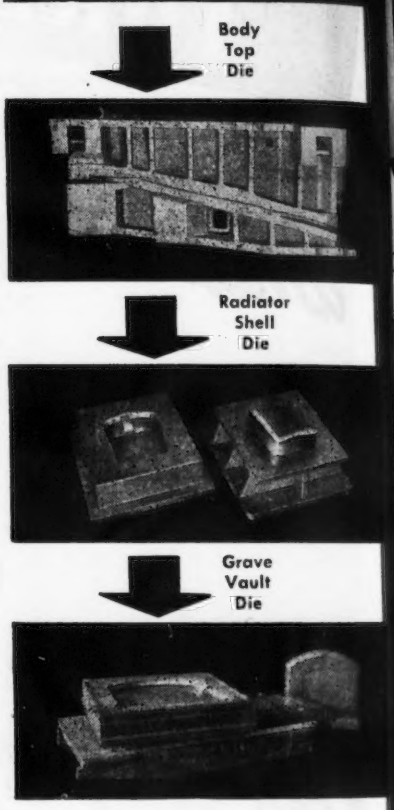

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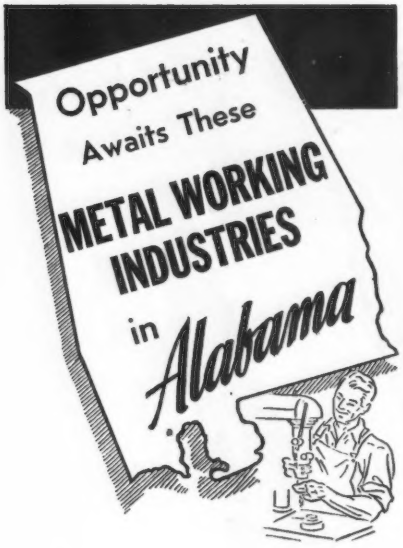

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to all the lofty moral generalities that are proclaimed in America, when he hears them against such a background? Neither in Greece nor in Poland, neither in India nor in Palestine are the American pronouncements combined with any willingness to get down into the dust of the arena and attempt to work out, within the limits set by human imperfections, a policy that will be both right and feasible. The ordinary Englishman remembers Woodrow Wilson's statement that the United States is the only idealistic country in the world—and he also remembers that the only Great Power that made any effort to achieve Wilson's ideals in hard practice was Great Britain. With every outburst of righteous indignation in America, the ordinary Englishman gets one degree more cynical about America's real intentions of active collaboration, and one degree more ready to believe that the only reliable helping hand is in Soviet Russia.

This is the popular, the instinctive reaction. Policy, however, should not be based on emotions and instincts but on cool calculation. At what the Americans call the "policy-making level," the effect of each of these recurrent spasms of Anglophobia is to raise, each time more seriously, the question of the extent to which British policy can safely be shaped in reliance on American collaboration. Just how much British safety can be gambled on American good will? In the political sphere, is it right to refrain, in the hope of obtaining American support for a general and universal system of security, from making special arrangements to assure British security? In the economic sphere, is it right to surrender the means of safeguarding British interests, as Breton Woods and the American commercial proposals would have us do, in the hope that American policy will be stable and sound? In general, how much purpose is served by painful attempts to adjust British policies to American wishes? It is plainly right to pay some price for an American-policy of genuine collaboration. But is the price we are asked to pay too high for what we are likely to get? These are the questions that are inevitably asked. They can be answered only by asking two more. How much more shall we get by trying to please the Americans? And how much less shall we get by going our own way?

The opinion was expressed in these columns immediately after the recent election that it was a defeat for the isolationists rather than a victory for

PREPARE IRON, STEEL PARTS
for painting
By Using NEW
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Out of the war has come a low-cost cleaning and surface conditioning material... Oakite CrysCoat No. 86. Scientifically designed and performance-proved, Oakite CrysCoat No. 86 provides in one time-saving operation these three important advantages:

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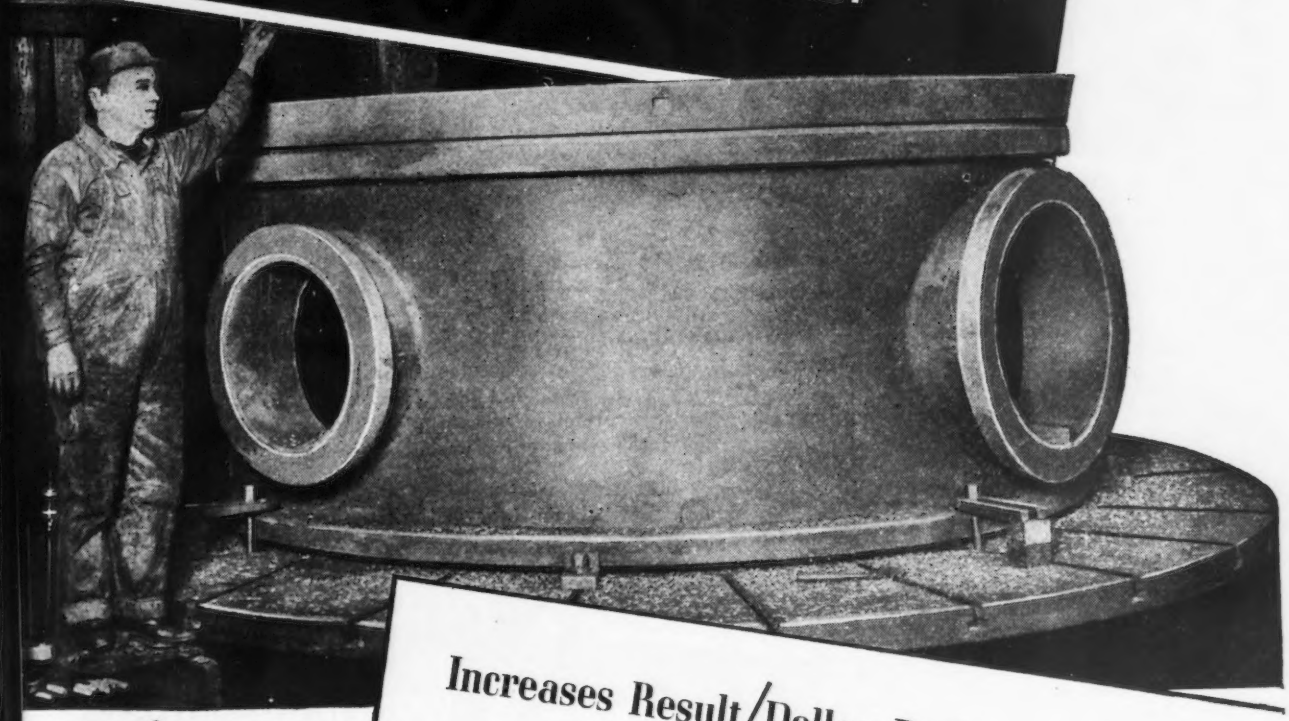

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(Advertisement)

Predicts Increased Use of Galvanized

By GEORGE H. OHMER
Chief Engineer
Dayton

• • • Hundreds of new postwar products in nearly every industry are being designed to utilize galvanized sheet metal for the first time now that electric arc welding has been made practical by the Galv-Weld Process.

HIGH CARBON STEEL: *Pipe assembly joined to 2 pieces of stamped low carbon steel. Welds have been regalvanized and the juncture around the periphery of the pipe has been filled and closed with Galv-Weld Alloy.*

Greater use of mill hot-dipped and electro-galvanized sheets and strips in postwar production is to be expected with the wide adoption of the Galv-Weld Process, which makes it possible to regalvanize welded seams and joints in galvanized sheet, plate and pipe.

Galv-Welded joints have withstood more than eight years of exposure in salt air mists along the Atlantic seaboard without a failure. Official government laboratory tests have proved Galv-Weld Alloy equal to and/or better than hot dip galvanizing in corrosion resistance. Fractures in the galvanized coating, due to forming, are easily regalvanized with Galv-Weld.

Railroads are using Galv-Weld Alloy for construction and repair of galvanized water tanks, signaling systems and towers, steel work buildings, piping, etc., while the petroleum industry has been quick to see the need for it in the maintenance of galvanized refinery equipment in place of periodic painting. The alloy is not affected by corrosive and acid-bearing fumes in refinery areas.

Already production proven in wartime service by the shipbuilding industry, this new process makes available to postwar designers the advantages of all-welded galvanized steel construction by providing 100% protection against rust and corrosion at the point of weld.

All-welded galvanized steel buildings for farm and industry, bridges, towers, storage tanks and other structural steel products also have been made feasible by the Galv-Weld Process, as well as being a "must" for underground storage tanks where protection against corrosion is paramount.

Manufacturers are invited to submit samples of products for producing examples of how they can be Galv-Welded. There is no cost for this demonstration.

Details may be secured from Galv-Weld Products, Dayton 10, Ohio.

genuine collaboration. It was not to be expected that confirmation would be so quickly forthcoming. Perhaps the most significant event of the last few weeks has been the readiness of Senator Ball, the extreme advocate of "internationalism," to make common cause with Senator Wheeler, the unrepentant isolationist, and to threaten "withdrawal from Europe," if American wishes are not immediately complied with. Collaboration, it appears, is not a policy to be pursued in America's own interest, but a reward to be offered to European nations so long as they are good, and withdrawn when they are bad. If so, it is not a policy that can be relied upon.

Moreover, it is important to realize that "collaboration" is universally defined in America as meaning only membership in the security council and its related organs and subscription to their funds. It does not imply anything at all about the policy to be pursued within these bodies. In so far as the question of policy has been raised at all in the current discussion, it has normally been to make it clear that there can be no promises, no commitments, no "automatic" obligations. A complete victory for Senator Ball's internationalists could still mean that the American delegates could go to the international meetings, as Philip Guedalla once said of the Baldwin Government, like inverted Micawbers, waiting for something to turn down. Nothing in fact has yet happened to show that American policy has emerged from the state that Mr. Lippmann calls "noble negatives"—and unfortunately the negatives are of more direct practical relevance than the nobility.

There is still a great deal of wishful thinking in Britain, even in the highest quarters, to the effect that good behaviour on our part will procure some great prize, such as an Anglo-American alliance, or an American guarantee, specific or general, of British territorial integrity, or at least a promise to put down aggression wherever it may appear. It is as well to be brutally frank: there is no more possibility of any of these things than of an American petition to rejoin the British Empire. All that has yet been decided is that the noble negatives will be uttered inside the conference room instead of from outside. If all other

This 20-page Bulletin gives detailed information on the Rotary Positive Displacement principle and its advantages. Characteristic curves are shown for different drives, together with sizes, dimensions, and complete specifications. Numerous installation photos show various applications for which Roots-Connersville Rotary Positive Blowers are particularly well adapted. Write for your copy of Bulletin 22-23-B-11.

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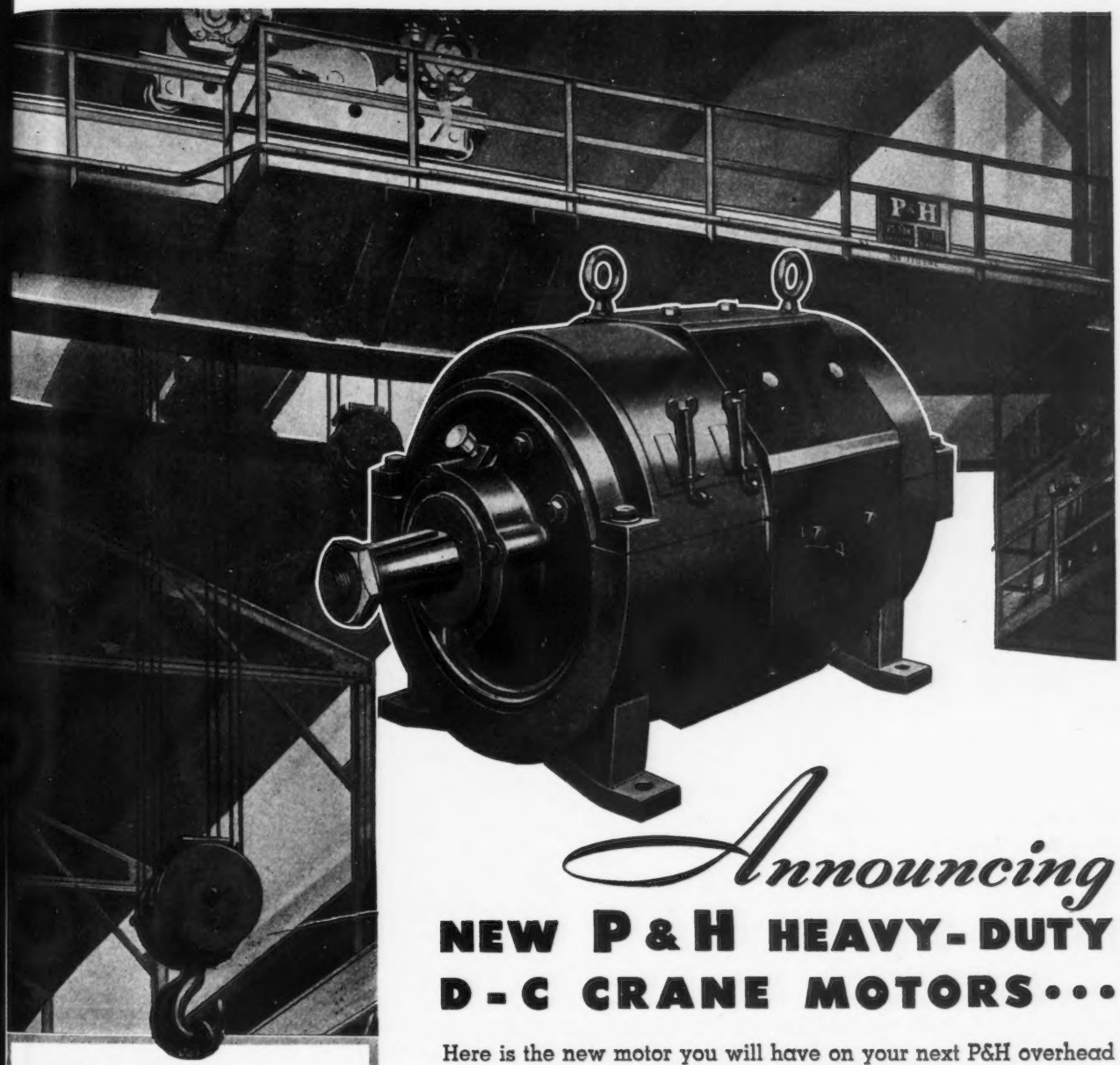
Roots CONNERSVILLE SINCE 1854 Rotary Positive BLOWERS



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nations were of impeccable character and behaviour, it is doubtful whether the present generation of Americans would promise any more. And given the rough and tumble of international life, it is most unprobable that we shall get any more by trying to be good.

How much less are we likely to get by going our own way? In great crises, nations see their interest clearly, and if the ultimate extremity of 1940 should ever repeat itself, American action would be the same. No nation surely ever tried harder to keep out of war than the United States between 1935 and 1940, but to no avail. No country surely ever blotted its American copybook more carefully than debt-defaulting, appeasing Britain, and yet we were given the aid we needed. It is true that there is a great difference between Lend-Lease and Cash-and-Carry, but whether in some future crisis we are offered the one or the other will depend infinitely more on the circumstances of the time than on anything that is done, now.

What, then, is the conclusion for British policy towards America? Clearly it is not that any quarrels should be picked. Quite on the contrary, every reasonable precaution should be taken to avoid giving offence. Nor should the hope, slender as it may be, of encouraging a genuine American collaboration be abandoned; on the contrary, it should be fostered by every reasonable means. But it is not reasonable so to fashion the peace settlement that it will entirely collapse if the hope is disappointed—that is, to have no alternatives to a dependence on American aid. And it is not reasonable to suppress legitimate British interests simply because they offend American susceptibilities. Let there by all means be a continuance of the policy of friendship and co-operation, and even of patience and forbearance under provocation. But let an end be put to the policy of appeasement which, at Mr. Churchill's personal bidding, has been followed, with all the humiliations and abasements it has brought in its train, ever since Pearl Harbor removed the need for it. Henceforward, if British policies and precautions are to be traded against American promises, the only safe terms are cash on delivery. And, if Americans find this attitude too cynical or suspicious, they should draw the conclusion that they have twisted the lion's tail just once too often.

In the air, at sea or on the ground.

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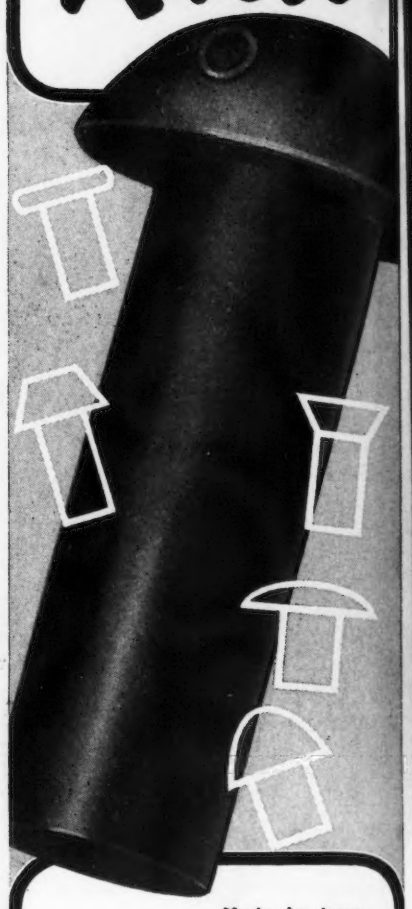

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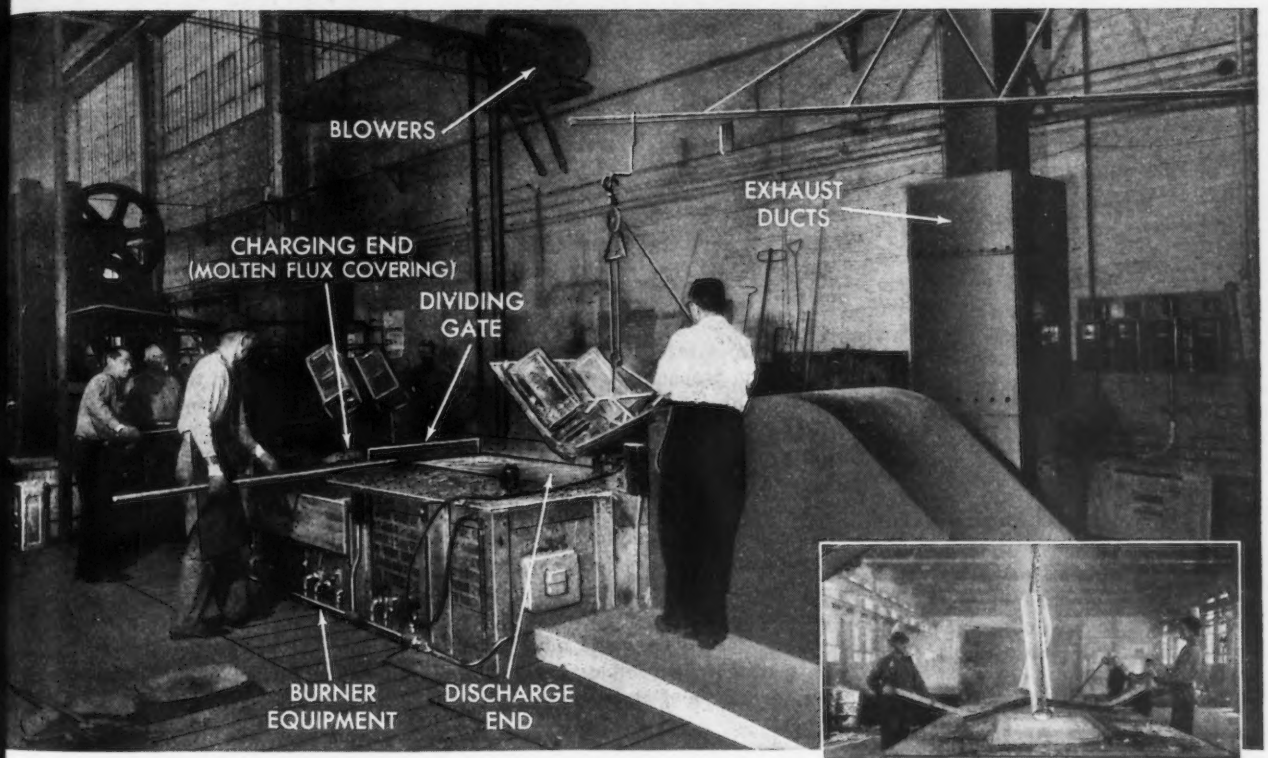
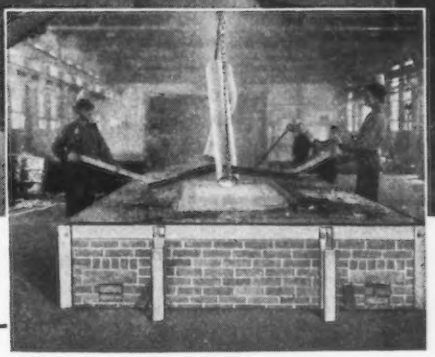


One of two new STEWART Galvanizing Settings at the Edison General Electric Appliance Co., Chicago, Ill., showing container stampings above flux at left and the containers being removed at the right. By means of a mechanical device, the containers completely turn end over end while passing through the zinc.



STEWART installation for galvanizing ship fittings and parts at the U. S. Navy Yard, Portsmouth, N. H.

Careful analysis of a manufacturer's requirements by Stewart production and furnace engineers is an important First Step in the creation of every Stewart Hot Dip Galvanizing installation. The characteristics of the work an installation must do determine many factors both in design, layout, construction.

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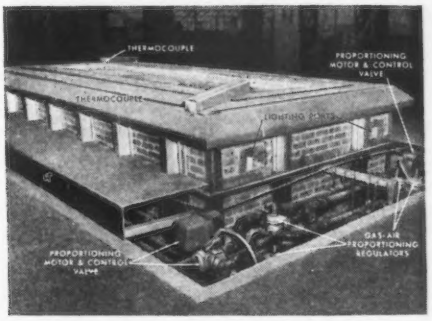
4. **UNIFORM BATH TEMPERATURE**

The installations shown here are typical of the industrial heat-treating equipment Stewart engineers are building every day, both large types to meet the specified requirements of manufacturers all over the continent, and a complete line of standard types.



STEWART Galvanizing installation at Norfolk Navy Yard showing piping for two-zone burner control, with double sets of burners in each zone, one for holding and both sets to bring up to heat and operation.

STEWART INDUSTRIAL FURNACE DIVISION of CHICAGO FLEXIBLE SHAFT CO.

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A letter, wire or 'phone call will promptly bring you information and details on STEWART furnaces, either units for which plans are now ready or units especially designed to meet your needs. Or, if you prefer, a STEWART engineer will be glad to call and discuss your heat treating problems with you.

MACHINE TOOLS

. . . News and Market Activities

50 Men Given 90 Day Leaves For Tool Work at National Acme Co.

Cleveland

• • • One of the first tangible strokes to cut through a manpower situation which has been the Gordian knot of machine tool makers here and almost everywhere else was taken a few days ago when 50 men were furloughed from the Army to work at the National Acme Co., Cleveland.

Part of some 7200 soldiers to be released on a temporary basis throughout the country, 48 of these men have already started work at National Acme, where the skilled labor shortage has been particularly acute in recent months. Most of them are working on night shifts where there were idle machines, and have already proved very satisfactory.

Released on 90-day furloughs, these men draw furlough pay and going civilian rates as well and enter this temporary employment in much the same manner as any other new employee. They fill out application blanks, take physical examinations, and sign up for maintenance of membership in the union. Accommodations for the men during this period have been arranged by the company in collaboration with government agencies.

National Acme, which has super priority, was simply unable to get skilled men and finally, under the auspices of Army Ordnance, arrangements for the release of these men were made. None of them were former employees, although the company was permitted to designate the qualifications of the men needed. In turn, the men are given a letter showing their working hours which they carry with their furlough papers. Needless to say, absenteeism is no problem with them.

Arrangements for the release of men from the armed forces are made directly between the branch and the employer—oddly enough, the War Manpower Commission does not enter except in special cases of foundries and forge shops.

Present indications are that only a relatively small proportion of the 7200 men will be released for machine tool work. Naturally, these men are being placed where the shortage is pronounced, and most of them to date have apparently been assigned to foundries and forge shops, with a few being sent to tire plants and textile mills, and a handful to the machine tool industry.

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Right now, the Army is handling this situation, but in the future the WMC will be involved. Furthermore, when men are discharged, WMC representatives will interview them at the point of discharge and try to direct them to the most critical occupations.

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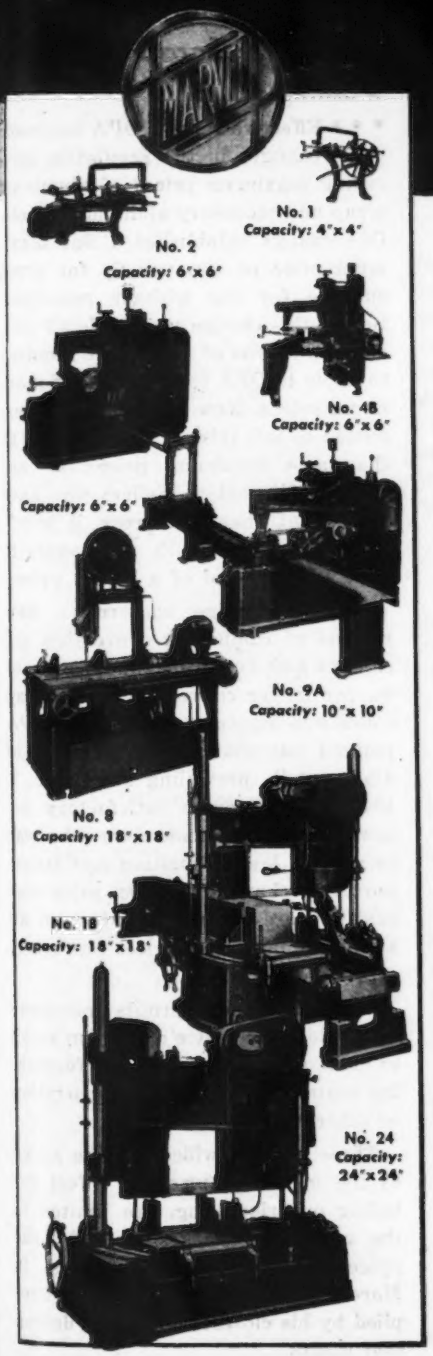

Keep 7 Steam Hammers Supplied with Forging Steel

At the Cicero plant of the Atlas Forgings Company, two MARVEL No. 9 High Speed Hack Saws, equipped with heavy duty work handling equipment keep 7 steam hammers supplied with forging steel. The Atlas Forging Company (like most of the other leading forge plants of the country that have accepted MARVEL Saws as standard) have found that the hack saw method of cutting steel TO EXACT WEIGHTS is far more efficient and economical than with any other method formerly used by the industry.

With these two MARVEL High Speed Saws one operator can keep 7 hammers supplied with EXACT Size steel and still have time for other work. The initial investment is small—and the cost per cut is unbelievably low. Contrast this with the old method of cutting-off, not requiring an extra heat, frequently with a resultant greater loss of steel.

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MARVEL SAWS

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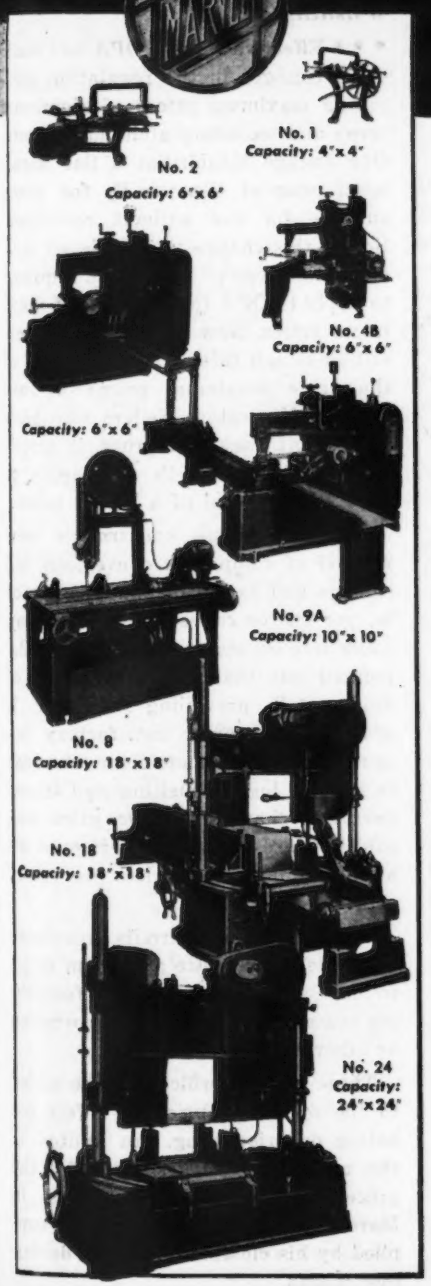

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MARVEL SAWS

NON-FERROUS METALS

. . . News and Market Activities

Expect New Modifications to Lead Order

New York

• • • The recently issued order, M-38, for the restriction and control of lead uses has been amended effective January 15 and producers and consumers are still busily occupied in studying the effects of the modified provisions. The original intent was to restrict lead use for less essential purposes by control of pig lead. It seems to have become necessary to exercise control by limiting or prohibiting certain end uses, which places the burden of compliance upon the consumer of lead. Certain omissions of the amended order, such as the failure to authorize the use of lead for the manufacture of X-ray protective equipment, may require its modification at an early date.

The modified order permits the unrestricted use of lead sheet and pipe for chemical equipment subject to corrosion requiring the use of lead. Lead pipe, sheet and fittings may also be used where municipality and State regulations for water service pipe permit no substitutes.

• • •

Protective Finish For Magnesium Developed

Cleveland

• • • Furniture and even automatic refrigerators may be very light after the war, N. H. Simpson, chief chemist of one of Consolidated Vultee's divisions said recently at the quarterly meeting of the Magnesium Association. Magnesium chairs would be one-third lighter than those of aluminum alloy made before the war and could be picked up by the housewife with only one finger.

Sofas, dining room tables, vacuum cleaners and other household pieces could be made correspondingly lighter, and could be finished in any color with a newly developed permanent corrosion protective finish for magnesium. Moreover, the surface is said to be harder than conventional finishes for furniture and other home equipment and hence scratch-free. Simpson and Paul R. Cutter, research chemist for Convair's Fort Worth division, developed the finish which already has made magnesium more practical for use on the B-32 Dominators built by the company.

The treatment requires degreasing and removal of a film coating, after which magnesium parts are connected to AC or DC and rinsed. This finish is known as C.V.A.C. No. 1.

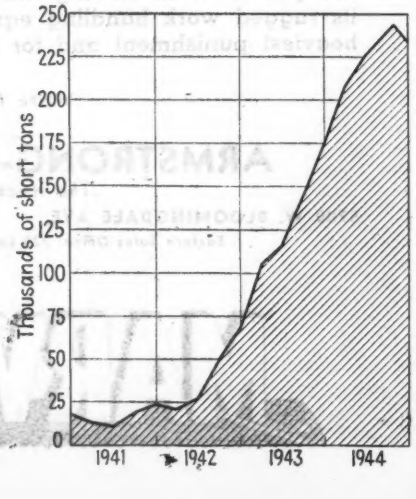
Aluminum

• • • All grades of aluminum scrap have firmed up recently under the impetus of the expanded war production program and the greater need for all forms of aluminum. Stock piles of government scrap withheld from the market under provisions of the surplus war property administration until acceptable floor prices are reached, are now being offered for sale. Plants producing primary aluminum in the form of ingots, extrusions, forgings, castings, etc., are said to be having difficulty in obtaining labor.

Copper

• • • Copper producers report that the copper supply position has been severely dislocated by weather conditions throughout the country. While immediate shortages are not anticipated it is predicted that the current period should retard the production of components requiring copper and copper alloys, even when imported through points of entry as far south as New Orleans.

STOCKS OF SLAB ZINC *in the United States at the end of the quarter. Statistics from the American Zinc Institute.*



•

Fix Aluminum Ceilings For Scrap and Ingot

Washington

• • • Effective Jan. 29, OPA has made three changes in the regulation governing maximum prices of aluminum scrap and secondary aluminum ingots. One change establishes a flat maximum price of 18c. per lb. for scrap suitable for use without remelting. Before this change was made all sellers of this type of scrap were required to apply to OPA for approval of maximum prices. Now plants will be permitted to sell this scrap to dealers at the same maximum prices as are charged fabricators. Sellers who have scrap that they can prove is worth more than 18c. per lb. may apply to OPA for approval of a higher price.

Another change concerns a new method of computing conversion toll charges and fixes a maximum price of 9c. per lb. for converting plant scrap solids into ingots on a toll basis. OPA pointed out that the flat charge of 3½c. per lb. prevailing since Dec. 7, 1944, did not prove satisfactory because it was not made clear who was to assume loss in melting and transportation charges. The 9c. price was said to represent a fair average of all applicable maximum prices previously established.

The third change permits processors who bale or briquette aluminum scrap to make separate charges for furnishing containers, storage, transportation or other extra services.

These charges which may be added to the maximum prices in effect for baling or briquetting, are limited to the maximum charges made by the processor for similar services in March, 1942, or the same service supplied by his closest competitor during that month.

Primary Metals

(Cents per lb., unless otherwise noted)

Aluminum, 99+%, del'd. (Min. 10,000 lb.)	15.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be.	$17.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb.)	$1.50 to $1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.5%, dollars per troy oz.	$4.50
Iridium, dollars per troy oz.	$120.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	$165.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

Remelted Metals

(Cents per lb. unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2)	9.00 to 10.00
Aluminum, deoxidizing No. 2, 3, 4	6.00 to 9.50
Brass Ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87	....	20.37
Copper, H.R.	....	17.37	....
Copper drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercial bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	....	36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	....

Aluminum

(Cents per lb., subject to extras on page, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 34c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NON-FERROUS SCRAP METAL QUOTATIONS

†*(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)*

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25
Automobile radiators	7.00
Zincy bronze borings	8.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25[1]
Manganese bronze solids	6.25[2]
Manganese bronze borings	6.50[1]
Manganese bronze borings	5.50[2]

OPA Group 4†

Refinery brass	4.75*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Other Copper Alloys!

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.375
Loose Yellow Brass Trimmings	7.875

Aluminum

Plant scrap, segregated

2S solids	8.00
Dural alloys, solids 14, 17, 18, 24S	5.00
25S turnings, dry basis	3.25
Low copper alloys 51, 52, 61, 63S solids	7.00
turnings, dry basis	5.50

Plant scrap, mixed

Solids	4.00
Turnings, dry basis	3.00

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	6.00
Old castings and forgings	5.00
Pistons, free of struts	5.00
Pistons, with struts	3.00
Old alloy sheet	5.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	3.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.00
Engravers, lithographers plates	6.00
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 26c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25½
Electrolytic, full size	22½
cut to size	30½
Rolled, oval, straight, 15 in. and longer	23¼
Curved	24¼
Brass Cast, 82-20, elliptical, 15 in. and longer	23½
Zinc: Cast, 99.99, 16 in. and over	16¼
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

Chemicals

(Cents per lb., delivery from New York)

Copper cyanide, tech., 100-lb. bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbls.	13.00-13.50
Nickel salts, single, 425-lb. bbls.	34.00
Silver cyanide, 100 oz. lots	40.82-41.125
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc, cyanide, 100-lb. dms.	33.00
Zinc, sulphate, 89% crystals, bbls.	6.80

SCRAP

Mills Have Three Weeks' Scrap Supply

Pittsburgh

• • • The steel mills in this area are now entering the tightest scrap pinch that has developed since the beginning of the war, and the keylog to the whole jam is obviously the weather. Continued cold weather, with snows and freezing rains, for more than a month has virtually stopped all yard activity and has caused almost a chaotic condition in so far as deliveries are concerned.

For the first time several mills estimate their stocks below the three week level, and it has been indicated that some mills are below the two week reserve. This is hardly a working supply when it is considered that part of it is extremely difficult to get at because of the ice and snow.

See page 97 for additional scrap news

Allocations have begun to move into Pittsburgh, but the only trouble is that from Chicago to Boston, the picture is pretty much as it is here. Mills and dealers in this belt are all having trouble meeting past commitments and present demands. Any substantial tonnages will have to come from the South or Far West, and in all likelihood the railroads will have trouble getting the scrap to the mill.

Transportation, bogging down terrifically, is adding a further burden on scrap movements. One dealer in this area indicated that about 68 cars of scrap consigned to a mill are tied up in railroad yards awaiting delivery. Railroads are having great difficulty in moving freight. Even company-owned railroads—the switching lines within large steel companies—are having trouble meeting the demands for hauling placed upon them by the steel mills.

The drop of ingot production in the Pittsburgh area this week, while it cannot all be attributed to the shortage of scrap, is the result of the impingement of the many factors that have been harassing steel operations. The least of these is by no means scrap shortages, but together with this difficulty is transportation problems, manpower deficits, cold weather, and other factors.

o o o

Springboard on Scrap May Be Reinstated

New York

• • • According to reports in the trade the OPA may soon reinstate the springboard on the sale of scrap. This move was recently recommended at an OPA-Industry meeting. At present, scrap is being brought from considerable distance on the basis of the shipping point price plus the transportation charge. It is said that the WPB also has its own plans for the pricing of scrap known as the "Zoning Plan" which would allow price action in any particular zone where conditions warrant it. At any rate because practically all steel prices have reached the ceiling levels and because of the scarcity of scrap, some new changes are expected within the next few weeks or so on pricing methods.

•

PITTSBURGH — Scrap shortages are beginning to show in steel production here and the pinch is without a doubt the tightest since the war started. Dealers and consumers alike are put into the position of not being able to move scrap, and the weather—the chief cause of the shortage—shows no signs of abating. Allocations are starting in this area and at least one mill has had to share its scrap with other mills. The railroads are having great difficulty in keeping scrap, as well as all other shipments, moving.

•

CHICAGO—Large new mill orders for secondary open hearth grades have been absent during the past week, possibly indicating renewed hesitancy based on satisfactory inventories and good war news. Broker transactions and industrial lists confirmed that blast furnace grades had hit ceilings in the case of choice scrap tonnages although some material was available below ceiling figures. Although mill offers on railroad scrap are not at ceiling on some specialties, acceptance of allocations at ceiling dictates ceiling quotations on these grades.

•

PHILADELPHIA — Last week's bad snowstorm slowed scrap shipments considerably with the result that mills are calling for increased quantities. With cast grades practically impossible to obtain, open hearthh grades are in even greater demand. Consumers have expressed their willingness to pay more than the former dollar springboard. To replace cast in foundry operations, some foundries are looking for low silicon pig iron. The scrap supply situation has potentialities of becoming serious. With scrap yards not placed on the new list of essential industries yards are fac with the possibility of losing their a ready scanty manpower to the draft to jobs on the critical and essential lis Some quarters have even gone so far to predict the shutting down of ope hearths in the next few months becau of scrap shortages if no action is take to save what is left of the scrap yar labor force.

•

DETROIT—Turnings grades were firm er here this week as a result of a bett bid from the major blast furnace use and also because of improved outsid orders which counter-balanced cancell tions by other mills. Despite bad weathe movement from the yards is somewha faster, believed inspired in part by fee ing on the part of some dealers that th Russian drive may end the Europea war shortly and lead to a price break down such as occurred late last summe

•

CLEVELAND—Weather is the predom inant factor here in a situation best de scribed as "lousy" by one buyer. Wit no immediate meteorological break i sight, machine shop turnings continues t pour forth in great quantities, showing intermittent signs of weakness from a price angle. Prices are at ceilings, o course, and shipments are going down down, down.

•

BUFFALO—The pinch in steelmaking scrap reached the allocation point this week with at least one interest obtaining both railroad and industrial material by directive. Contracts for 30,000 to 35,000 tons made by the leading consumer this month at maximum prices have cleaned up all soft spots in the market. Half this tonnage represents purchases of turnings, recent stepchild of the scrap trade. Mill receipts continue limited by the snow-bound condition of the railroads with restoration of normal service expected to take another month or 6 weeks.

•

BOSTON—Little business has been conducted of late. Reasons include scarcity of material and labor, snow buried yard stockpiles and lack of freight cars. Foundries in general are hard pushed for scrap. Regular turnings sell readily enough, but market for alloy is draggy and prices down around $5 a ton on cars.

•

BIRMINGHAM — Heavier demand for all grades of material is being felt in this district. Long turnings and cast iron borings, two of the scrap items still below ceiling prices here have advanced $1 per ton to bring $9.50 to $10. Considerable tonnages of electric furnace and foundry grades are moving to northern mills to meet conditions occasioned by severe weather.

•

ST. LOUIS—Continued bad weather and the shortage of men to gather and process scrap iron have caused light offerings, and the district steel mills are eating into their stock piles, which contain only enough supplies for the next 30 days.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4). Where ceiling prices are quoted they do not include brokerage fee or adjusted transportation charges. Asterisks indicate grades selling at ceilings.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
R. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
R. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.00*
Hvy. steel forge turn.	19.00*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break. cast	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	24.45*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	$13.00 to 13.50
Short shovel. turn.	15.25 to 15.75
Cast iron borings	14.25 to 14.75
Mix. bor.&short turn.	13.25 to 13.75
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR hvy. melt.	19.75*
Reroll rails	22.25*
Cut rails, 3 ft. and under	22.25
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Angles & splice bars	22.25*
Std'ard stl. car axles	25.75*
No. 3 steel wheels	22.75 to 23.25
Couplers & knuckles	23.25*
Miscellaneous rails	20.25
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast	20.00*
No. 1 agricul. cast	20.00*
Cast iron car wheels	20.00*
Hvy. breakable cast	16.50*
RR. grate bars	15.25
Brake shoes	15.25
Stove plate	19.00*
Clean auto cast	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.00 to $18.50
No. 2 hvy. melting	18.00 to 18.50
No. 1 bundles	18.00 to 18.50
No. 2 bundles	18.00 to 18.50
Mach. shop turn.	8.50 to 9.00
Shoveling turn.	10.50 to 11.00
Cast iron borings	10.50 to 11.00
Mixed bor. & turn.	9.50 to 10.00
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Low phos. plate	20.50 to 21.50
Scrap rails	20.00 to 21.00
Stove plate	16.00 to 16.50

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
Busheling	15.05*
No. 1 and 2 bundles	15.05*
Turnings, shovelings	$11.06 to 12.05*
Turnings, regular	9.06 to 10.05
Mixed bor. & turn.	10.05*
Cl'n cast, chem. bor.	13.06 to 14.15
Breakable cast	21.57 to 21.87
Stove plate	20.00 to 23.51
Mach'ery cast, truck	21.00 to 23.51

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Mach. shop turn.	$11.00 to 11.50
Short. shov. turn.	13.00 to 13.50
Cast iron borings	12.25 to 12.75
Mixed bor. & turn.	11.00 to 11.50
No. 1 cupola cast	20.00*
Charging box cast	15.50 to 16.50
Hvy. breakable cast	15.00 to 16.00
Stove plate	18.50 to 19.00
Flashings	17.32*
Low phos. plate	18.50 to 19.82
Automotive cast	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle, forge turn	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Hvy. melting	$17.50*
No. 1 locomo. tires	20.00
Misc. std. sec. rails	19.00
Railroad springs	22.00*
Bundled sheets	17.50*
Heavy axle turn.	17.00*
Machine shop turn.	$10.00 to 10.50
Rerolling rails	21.00
Steel car axles	21.50 to 22.00
Steel rails und. 3 ft.	21.50*
Steel angle bars	21.00*
Cast iron car wheels	18.50*
No. 1 machin'y cast	20.00*
Railroad malleable	21.00 to 21.50
Breakable cast	16.50*
Stove plate	17.00
Grate bars	15.25*
Brake shoes	15.25*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Scrap rails	18.50
Rails for rerolling	20.50*
Rails 3 ft. & under	21.00*
Angles & splice bars	20.50*
Long turn.	$9.50 to 10.00
Cast iron borings	9.50 to 10.00
Steel axles	18.00*
Stove plate	19.00*
Bar crops and plate	19.50*
Structural and plate	19.50*
No. 1 cast	20.00*
Cast iron carwheels	16.50 to 17.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	$13.50 to 14.00
Short shovel. turn.	16.00 to 16.50
Cast iron borings	15.00 to 15.50

NEW YORK

Dealers' buying prices, per gross ton, on cars

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Hyd. comp. black bundles	15.33*
Hyd. comp. galv. bundles	13.33*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
No. 1 cupola cast	20.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Stove plate	19.00*
Cl'n chem. cast bor.	14.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
No. 1 cupola cast	20.00*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00*
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	18.00*
Low phos. billet and bloom crops	23.66*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch.	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$15.50 to $16.25
RR. hvy. melting	15.50 to 16.25
No. 2 hvy. melting	14.50 to 15.25
No. 2 bales	13.50 to 14.25
No. 3 bales	9.50 to 10.59
Mach. shop turn.	7.00
Elec. furn. 1 ft., und.	15.50 to 17.00
No. 1 cupola cast	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$14.00 to $15.00
No. 2 hvy. melting	13.00 to 14.00
No. 2 bales	12.00 to 13.00
No. 3 bales	9.00 to 10.00
Mach. shop turn.	4.50
No. 1 cupola cast	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 hvy. melting	$13.50
RR. hvy. melting	13.50
No. 3 bundles	11.50
Elec. furn. 1 ft., und.	$16.00 to 17.00
No. 1 cupola cast	20.00*

Comparison of Prices . . .

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. (Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Jan. 23, 1945	Jan. 16, 1945	Dec. 19, 1944	Jan. 25, 1944
Hot rolled sheets*	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)*	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates*	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails*	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails*	$40.00	$40.00	$40.00	$40.00
Light rails*	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs, rerolling	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Jan. 23, 1945	Jan. 16, 1945	Dec. 19, 1944	Jan. 25, 1944
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	25.11	25.11	25.11	23.94
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	37.34	37.34	37.34	37.34
Ferromanganese‡	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.25	22.50
No. 1 cast, Pittsburgh	20.00*	20.00*	20.00*	20.00
No. 1 cast, Philadelphia	20.00*	20.00*	20.00*	20.00
No. 1 cast, Chicago	20.00*	20.00*	20.00*	20.00

*F.o.b. shipping point.

Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$7.00	$7.00	$7.00	$7.00
Foundry coke, prompt	8.25	8.25	8.25	8.25

Non-Ferrous Metals: (Cents Per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 141-148.
* For interim increase on delivered price granted by OPA as of Jan. 11, 1945, see detailed price tables.

Composite Prices . . .

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943 issue.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
January 23, 1945	2.33408c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.33408c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30837c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.25513c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL LOW	SCRAP STEEL HIGH
1944	2.30837c., Sept. 5	2.272349c., Jan. 4	$23.61	$23.61	$15.67, Oct. 24	$19.17
1943	2.25513c.,	2.25513c.,	23.61	23.61	19.17	19.17
1942	2.26190c.,	2.26190c.,	23.61	23.61	19.17	19.17
1941	2.43078c.,	2.43078c.,	$23.61, Mar. 20	$23.45, Jan. 2	$19.17, Apr. 10	$22.00, Jan. 7
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	16.04, Apr. 9	21.83, Dec. 30
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	14.08, May 16	22.50, Oct. 3
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	11.00, June 7	15.00, Nov. 22
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	12.67, June 8	21.92, Mar. 30
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	12.67, June 9	17.75, Dec. 21
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	10.33, Apr. 29	13.42, Dec. 10
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	9.50, Sept. 25	13.00, Mar. 13
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	6.75, Jan. 3	12.25, Aug. 8
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	6.43, July 5	8.50, Jan. 12
1931	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	8.50, Dec. 29	11.33, Jan. 6
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	11.25, Dec. 9	15.00, Feb. 18
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	14.08, Dec. 3	17.58, Jan. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 0.10c. per lb. under base; primes 0.25c. above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price for annealed, bright finish wires, commercial spring wire. (15) Add 10c. per 100 lb. to delivered price—OPA interim increase, Jan. 11, 1945. (16) Add 15c. per 100 lb. to delivered price—OPA interim increase, Jan. 11, 1945. (17) Add 10c. per 100 lb. to delivered price of plates produced to sheared mill or universal mill width and length tolerances—OPA interim increase, Jan. 11, 1945.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[13]	DELIVERED TO Detroit	New York	Philadelphia
Hot Rolled Sheets[11]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold Rolled Sheets[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized Sheets (24 gage)[14]	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling Sheets (20 gage)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long Ternes[2]	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢
Hot Rolled Strip[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.40¢	
Cold Rolled Strip[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester=3.00¢)					2.90¢	3.16¢	
Cooperage Stock Strip	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R Strip	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester=3.35¢)					3.05¢	3.31¢	
Coke Tin Plate, Base Box	$5.00	$5.00	$5.00						$5.10					5.36¢	5.32¢
.25 / .50 / .75 Electro Tin Plate, Box	$4.35 / $4.50 / $4.65	$4.35 / $4.50	$4.35 / $4.50 / $4.65						$4.60 / $4.75						
Black Plate (29 gage)[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[12]			3.37¢
Mfg. Ternes, Special Box	$4.30	$4.30	$4.30						$4.40						
Carbon Steel Bars	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth=2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail Steel Bars[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (Billet) Bars[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢[12]	2.25¢	2.39¢	
Reinforcing (Rail) Bars[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	c2.55¢[12]	2.25¢		2.47¢
Cold Finished Bars[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢		(Detroit=2.70¢)			(Toledo=2.80¢)			2.99¢	2.97¢
Alloy Bars, Hot Rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massillon, Canton=2.70¢)						2.80¢		
Alloy Bars, Cold Drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
Carbon Steel Plates[17]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	(Coatesville and Claymont=2.10¢) 2.10¢	2.35¢		2.45¢	2.65¢	2.32¢	2.29¢	2.15¢
Floor Plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy Plates	3.50¢	3.50¢			(Coatesville=3.50¢)						3.95¢	4.15¢		3.70¢	3.50¢
Structural Shapes	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem=2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R 0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester=3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester=4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester=6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester=8.55¢)								
Bright Wire[14]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester=2.70¢)		(Duluth=2.65¢)			3.10¢			2.92¢
Galvanized Wire	Add proper size extra and galvanizing extra to Bright Wire base.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester=3.30¢)					3.70¢			3.52¢
Steel Sheet Piling	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

EXCEPTIONS TO PRICE SCHED. NO. 6

Slabs—Andrews Steel Co. $41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. $41; Phoenix Iron Co. (rerolling) $41, (forging) $47; Granite City Steel $47.50.

Blooms—Phoenix Iron Co. (rerolling) $41, (forging) $47; Pgh. Steel Co. (reroll) $38.25, (forging) $44.25. Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth.

Sheet bar—Empire Sheet & Tin Plate Co. $39 mill; Wheeling Steel Corp. $38 Portsmouth, Ohio.

Billets, Forging—Andrews Steel Co. $50 basing pts.; Follansbee Steel Corp. $49.50 Toronto; Phoenix Iron Co. $47.00 mill. Geneva Steel Co. $64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. $49.50.

Billets, Rerolling—Continental Steel Corp. may charge Acme Steel in Chicago switching area $34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) $41 mill; Wheeling Steel Corp. 4 in. sq. or larger $37.75, smaller $39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at $39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. $41 mill; Continental Steel Corp. (1¾ x 1¾) $39.50, (2 x 2 $40.60 Kokomo, Ind. (thse prices include $1 size extra); Keystone Steel & Wire Co. $36.40 Peoria; Connors Steel Co. $40.60 Birmingham; Ford Motor Co. $34 Dearborn, Mich. Geneva Steel Co. $58.64 f.o.b. Pac. C. Pgt. Steel Co. $43.50.

Structural Shapes—Phoenix Iron Co. $2.35 basing pts. (export) $2.50 Phoenixville; Knoxville Iron Co. $2.30 basing points.

Rails—Sweet Steel Co. (rail steel) $50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron Corp., $45 Pueblo.

Hot Rolled Plate—Granite City Steel Co. $2.65 mill; Knoxville Iron Co. $2.25 basing pts.; Kaiser Co. and Geneva Steel Co. $3.20 Pacific Ports; Central Iron and Steel Co. $2.50 basing points; Granite City Steel Co. $2.35 Granite City.

Merchant Bars—W. Ames Co., 10 tons and over, $2.85 mill; Eckels-Nye Steel Corp., $2.50 basing pts. (rail steel) $2.40; Phoenix Iron Co. $2.40 basing pts.; Sweet Steel Co. (rail steel) $2.35 mill; Joslyn Mfg. & Supply Co., $2.35 Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar) $2.35 Chicago; Knoxville Iron Co. $2.30 basing pts. Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill. Milton Mfg. Co. $2.75 f.o.b. Milton, Pa.

Pipe Skelp—Wheeling Steel Corp., Benwood, $2.05 per cwt.

Reinforcing Bars—W. Ames & Co., 10 tons and over, $2.85 mill; Sweet Steel Co. (rail steel) $2.35 mill; Columbia Steel Co. $2.50 Pacific Ports.

Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Mansfield, Mass., f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass. f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co. for delivery except Texas and Okla. Chicago, base, f.o.b. Fort Worth, Tex.; Conors Steel Co. shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co. $2.30 Chicago; Knoxville Iron Co. $2.25 basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel Co., $2.25 Parkersburg.

Galvanized Sheets—Andrews Steel Co. $3.75 basing pts.; Parkersburg Iron & Steel Co. $3.85 Parkersburg; Continental Steel Co., Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is $2.45 per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-49 Ann.
**Philadelphia	3.518	4.872[8]	5.018a	3.922	4.772	3.605	3.666	3.822	4.072	5.966	7.066	7.272	8.322
New York	3.590	4.613[3]	5.010	3.974[6]	4.772	3.768	3.756	3.853	4.103	6.008	7.108	7.303	8.353
Boston	3.744	4.744[9]	5.224[9]	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.262	7.344	8.394
Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.052	...	....	....	....
Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.165	...	....	....	....
Chicago	3.25	4.20	5.231	3.60	4.65[17]	3.55	3.55	3.50	3.75	5.75	6.85	6.85	7.90
Milwaukee	3.387	4.337[3]	5.272[4]	3.737	4.787[17]	3.687	3.687	3.637	3.887	5.937	7.037	7.037	8.137
Cleveland	3.35	4.40	4.877[4]	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.056	6.85	7.90
Buffalo	3.35	4.40	4.754	3.819	4.669	3.63	3.40	3.35	3.75	5.75	6.85	6.85	7.90
Detroit	3.45	4.50	5.004	3.70	4.689[17]	3.609	3.661	3.45	3.80	6.08	7.18	7.159	8.209
Cincinnati	3.425	4.475[3]	4.825[5]	3.675	4.711	3.611	3.691	3.611	4.011	...	....	....	....
St. Louis	3.397	4.347[3]	5.172[4]	3.747	4.931[17]	3.697	3.697	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	6.85	6.85	7.90
St. Paul	3.51	4.48	5.257[4]	3.86	4.35[17]	3.813[3]	3.813[3]	3.763[3]	4.361	6.09	7.19	7.561	8.711
Omaha	3.865	5.443	5.608[4]	4.215		4.165	4.165	4.115	4.43				
Indianapolis	3.58	3.58	4.568	4.918	3.768	4.78	3.63	3.58	3.98	6.08	7.18	7.18	8.28
Birmingham	3.45	....	4.75	3.70	....	3.55	3.55	3.50	4.43	....	....	....	....
Memphis	3.962[7]	4.66	3.265	4.215	....	4.065	4.065	4.015	4.33	....	....	....	....
New Orleans	4.058*	4.95	5.359	4.308	....	4.158	4.158*	4.108*	4.629	....	....	....	....
Houston	3.763	5.573	6.313[1]	4.313	....	4.25	4.25	3.75	6.373[3]	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20[3]	6.10[4]	4.95	5.613[15]	4.95	4.65	4.40	5.583	8.304	9.404	9.404	10.454
San Francisco	4.55[14]	7.30[4]	6.35[4]	4.50[14]	7.333[17]	4.65[14]	4.35[14]	4.15[14]	5.333	8.304	9.404	9.404	10.454
Seattle	4.65[12]	7.05[4]	5.95[4]	4.25[12]	....	4.75[12]	4.45[12]	4.35[12]	5.783	...	9.404	....	....
Portland	4.65[11]	6.60[4]	5.75[4]	4.75[11]	....	4.75[11]	4.45[11]	4.45[11]	5.533	8.304	9.404	8.304	9.404
Salt Lake City	4.53[17]	....	6.17[18]	5.53[17]	....	4.98[17]	4.98[17]	4.88[17]	5.90	...	....	....	....

National Emergency Steels

MILL EXTRAS

Designation	Basic Open-Hearth		Electric Furnace		Designation	Basic Open-Hearth		Electric Furnace	
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
NE 8612	0.65¢	$13.00	$1.15	$23.00	NE 9427	0.75	15.00	1.25	25.00
NE 8615	0.65	13.00	1.15	23.00	NE 9430	0.75	15.00	1.25	25.00
NE 8617	0.65	13.00	1.15	23.00	NE 9432	0.75	15.00	1.25	25.00
NE 8620	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00
NE 8622	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00
NE 8625	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00
NE 8627	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00
NE 8630	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00
NE 8632	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00
NE 8635	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00
NE 8637	0.65	13.00	1.15	23.00					
NE 8640	0.65	13.00	1.15	23.00					
NE 8642	0.65	13.00	1.15	23.00	NE 9722	0.65¢	$13.00	$1.15	$23.00
NE 8645	0.65	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00
NE 8647	0.65	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00
NE 8650	0.65	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00
					NE 9742	0.65	13.00	1.15	23.00
NE 8712	0.70¢	$14.00	$1.20	$24.00	NE 9745	0.65	13.00	1.15	23.00
NE 8715	0.70	14.00	1.20	24.00	NE 9747	0.65	13.00	1.15	23.00
NE 8717	0.70	14.00	1.20	24.00	NE 9750	0.65	13.00	1.15	23.00
NE 8720	0.70	14.00	1.20	24.00	NE 9763	0.65	13.00	1.15	23.00
NE 8722	0.70	14.00	1.20	24.00	NE 9768	0.65	13.00	1.15	23.00
NE 8725	0.70	14.00	1.20	24.00					
NE 8727	0.70	14.00	1.20	24.00	NE 9830	$1.30	$26.00	$1.80	$36.00
NE 8730	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00
NE 8732	0.70	14.00	1.20	24.00	NE 9935	1.30	26.00	1.80	36.00
NE 8735	0.70	14.00	1.20	24.00	NE 9837	1.30	26.00	1.80	36.00
NE 8737	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00
NE 8740	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00
NE 8742	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00
NE 8745	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00
NE 8747	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00
NE 8750	0.70	14.00	1.20	24.00					
					NE 9912	$1.20	$24.00	$1.55	$31.00
NE 9415	0.75¢	$15.00	$1.25	$25.00	NE 9915	1.20	24.00	1.55	31.00
NE 9417	0.75	15.00	1.25	25.00	NE 9917	1.20	24.00	1.55	31.00
NE 9420	0.75	15.00	1.25	25.00	NE 9920	1.20	24.00	1.55	31.00
NE 9422	0.75	15.00	1.25	25.00	NE 9922	1.20	24.00	1.55	31.00
NE 9425	0.75	15.00	1.25	25.00	NE 9925	1.20	24.00	1.55	31.00

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb. irrespective of size. **Note 2:** For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, A.I.S.I. Steel Products Manual. **Note 3:** When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and $5 per gross ton for billets, blooms and slabs. **Note 4:** The extras shown are in addition to the base price of $2.70 for 100 lb. on finished products and $54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 1999 lb. (7) 400 to 1999 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271c. for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports**)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

SEMI-FINISHED STEEL

Ingots, Carbon, Rerolling

Base per gross ton, f.o.b. mill.... $31.00

Exceptions: Phoenix Iron Co. may charge $33.75; Kaiser Co., $43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., $34.25; Pgh. Steel Co., $33.10.

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown $36.00

Exceptions: Phoenix Iron Co. may charge $43.00; Empire Sheet & Tinplate Co., $39.25, f.o.b. Mansfield, Ohio; West Coast producers, $48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co., $38.10.

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh $45.00

Exceptions: C/L delivered Detroit add $2.00; delivered East Michigan add $3.00. Connors Steel Co may charge $46.00 f.o.b. Birmingham.

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.00 higher; delivered E. Michigan, $3 higher; f.o.b. Duluth, billets only, $2.00 higher; billets f.o.b. Pacific ports are $12 higher. Provo, $11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem, per gross ton $54.00

Price delivered Detroit $2.00 higher; E. Michigan, $3.00 higher.

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; E. Michigan, $3 higher.

Price Exception: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(*No. 5 to 9/32 in.*)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(*F.o.b. Pittsburgh, Bethlehem, Syracuse*)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

BAKER TRUCK

with *1 Operator*

does work of 7 men with hand trucks

—Releasing these men for productive work

● This company uses a Baker Low-Lift Truck for its material handling operations in connection with the manufacture of high alloy special resistance wire, and welding rods. The truck unloads raw materials from freight car or highway truck, transports them to the foundry, stores the ingots and moves them on skids to storage yard or to reheating furnace, where they are prepared for rolling into 2½" square bars. After bars have been cut into billets and ground, the truck carries them on skids either to storage or to other reheating furnaces, to prepare them for rolling into strips or round stock.

Weights per trip vary from 3,000 to 10,000 lbs., trips vary from 100 to 500 ft. Hundreds of tons of skidded metals are handled in the course of a week by the one truck. Formerly, this work required as many as 7 men with hand trucks. These men have now been released for actual production work—helping to solve the company's manpower problem.

The new Baker Catalog No. 52 describes many case histories showing how Baker Trucks effect similar savings in a wide variety of installations. Call your nearest Baker representative or write for your copy today.

BAKER INDUSTRIAL TRUCK DIVISION *of The Baker-Raulang Company*

2175 West 25th Street • Cleveland, Ohio

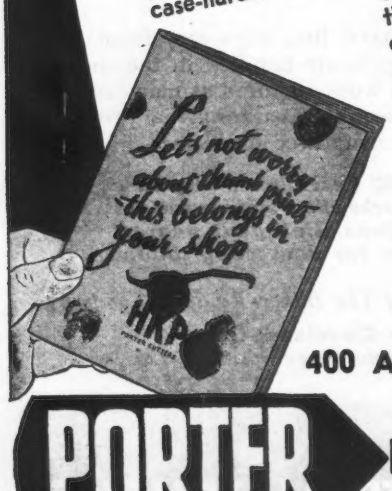
In Canada: Railway and Power Engineering Corporation, Ltd.

Baker INDUSTRIAL TRUCKS

POWER RODS, BOLTS, BARS, CABLE, WIRE, CHAIN TO CUT BY HAND

PORTER HKP CUTTERS work anywhere that two normally strong hands are available to put a few pounds pressure on the handles. Toggle-joint leverage will increase this **pounds** pressure to **tons** pressure on the jaws and even case-hardened chain can be cut "where is and as is". Standard models meet most production, construction, maintenance and emergency requirements.

The same power principle is applied to special tools for heading, pressing, crimping, punching and caulking with equal effectiveness. Send for our free booklet on tool maintenance to make clippers, saws, chisels, files and other tools do better work and last longer.



H. K. PORTER, INC.
400 Ashland St., Everett 49, Mass.

PORTER HKP CUTTERS

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh Di... and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought p... Base Price—$200.00 per Net To...

	Black	G...
Steel (Butt Weld)		
⅛ in.	62½	
¼ in.	66½	
⅜ to 3 in.	68½	
Wrought Iron (Butt Weld)		
⅛ in.	24	
¼ in.	30	
⅜ and 1¼ in.	34	
1½ in.	33	
2 in.	37½	
Steel (Lap Weld)		
2 in.	61	
2½ and 3 in.	64	
3½ to 6 in.	66	
Wrought Iron (Lap Weld)		
2 in.	30½	
2½ to 3½ in.	31½	
4 in.	33½	
4½ to 8 in.	32½	
Steel (Butt, extra strong, plain en...		
⅛ in.	61½	
¼ in.	65½	
⅜ to 3 in.	67	
Wrought Iron (Same as Above)		
⅛ in.	25	
¼ in.	31	
⅜ to 3 in.	33	
Steel (Lap, extra strong, plain en...		
2 in.	59	
2½ and 3 in.	62	
3½ to 6 in.	66½	
Wrought Iron (Same as Above)		
2 in.	32½	
2½ to 4 in.	29	
4½ to 6 in.	27½	

On butt weld and lap weld steel p... jobbers are granted a discount of 5%. ... less-than-carload shipments prices a... determined by adding 25 and 30% a... the carload freight rate to the base ca...

F.o.b. Gary prices are two points low... discount or $4 a ton higher than Pitt... burgh or Lorain on lap weld and ... point lower discount, or $2 a ton high... on all butt weld.

CAST IRON WATER PIPE

	Per Net To...
6-in. and larger, del'd Chicago	$54....
6-in. and larger, del'd New York	51....
6-in. and larger, Birmingham	46....
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	53....
6-in. and larger f.o.b. cars, Seattle	71....

Class "A" and gas pipe, $3 extra; 4-i... pipe is $3 a ton above 6-in. Prices abov... are for lots of less than 200 tons. Fo... 200 tons or over, 6-in. and larger a... $45 at Birmingham and $53.80 delivere... Chicago, $59.40 at San Francisco a... Los Angeles, and $76.30 at Seattle. De... livered prices do not reflect new 3 pe... cent tax on freight rates.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. Net base prices per 10... ft. f.o.b. Pittsburgh, in carload lots.

	Seamless Cold Drawn	*Seamless Hot Rolled*	*Lap Weld Hot Rolled*
2 in. o.d. 13 B.W.G.	15.03	13.04	13....
2½ in. o.d. 13 B.W.G.	20.21	17.54	16....
3 in. o.d. 12 B.W.G.	22.48	19.50	18....
3½ in. o.d. 11 B.W.G.	28.37	24.62	23....
4 in. o.d. 10 B.W.G.	35.20	30.54	28....

(Extras for less carload quantities)

40,000 lb. or ft., and over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

WIRE PRODUCTS

the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	Base per Keg	
andard wire nails....	$2.25‡	$3.05‡
oated nails	2.25‡	3.05‡
ut nails, carloads	4.10	....
	Base per 100 lb.	
nnealed fence wire...	$3.05	$3.55
nnealed galv. fence wire	3.40	3.90
	Base Column	
oven wire fence* ...	.67	.35
ence posts, carloads...	.69	.86
ingle loop bale ties...	.59	.84
alvanized barbed wire**	.70	.80
wisted barbless wire..	.70	....

*15½ gage and heavier. **On 80-rod pools in carload quantities.
†Prices subject to switching or transportation charges.
‡Add 25c. per 100 lb. to delivered price—OPA interim increase, Jan. 11, 1945.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:
Base discount less case lots

	Per Cent Off List
½ in. & smaller x 6 in. & shorter...	65½
9/16 & ⅝ in. x 6 in. & shorter.....	63½
¾ to 1 in. x 6 in. shorter.....	61
1⅛ in. and larger, all lengths.....	59
All diameters over 6 in. long.....	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:
(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive.....	59
1⅛ to 1¼ in. inclusive.....	57
1⅜ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller.....	..	64
½ in. and smaller	62	..
⅝ in. through 1 in.....	..	60
9/16 in. through 1 in.....	59	..
1⅛ in. through 1½ in.....	57	58
1⅝ in. and larger.....	56	..

In full keg lots, 10 per cent additional discount.

Stove Bolts	*Consumer*
Packages, nuts loose .....71 and 10	
In packages, with nuts attached.....	71
In bulk	80

On stove bolts freight allowed up to 35c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets
(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets
(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....65 and 5	

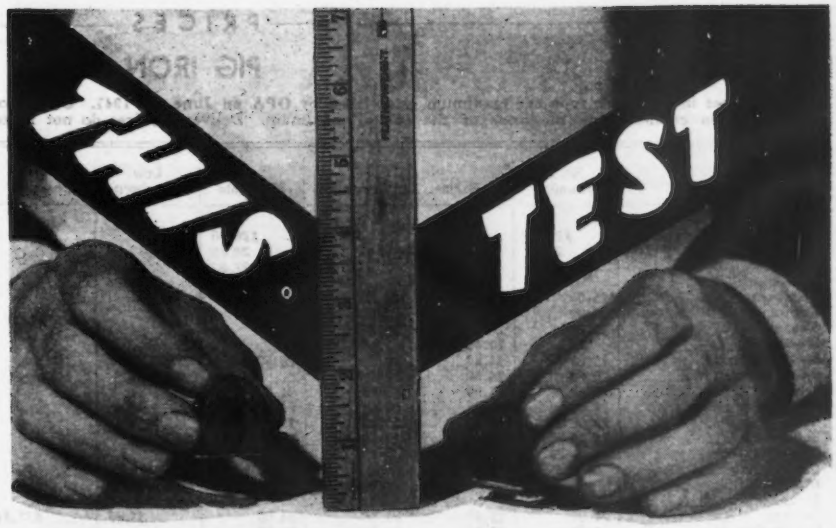
Cap and Set Screws	*Consumer Per Cent Off List*
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.....	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes....	36
Fillister head cap, listed sizes.....	51

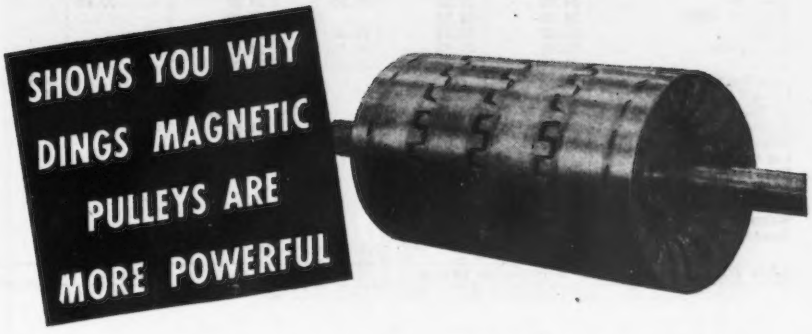
Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C....	$6.00	$12.00
15-lb. coating I.C....	7.00	14.00
30-lb. coating I.C....	7.50	15.00





For: Separating ferrous and non-ferrous scrap. Removing iron from foundry sand.

TAKE two Alnico horseshoe magnets and place a steel bar or keeper across the poles of one. By lowering them slowly toward two paper clips on the desk you will find that one clip will be snapped up by the unkeepered magnet at a height of approximately 1 inch from the table. The keepered magnet will not attract the other clip until it is approximately ¼ inch from the table.

Steel coil covers on a magnetic pulley act like the steel bar or keeper on the horseshoe magnet. Bronze coil covers, being non-magnetic, act the same as no keeper at all.

Dings Pulleys are all equipped with *bronze* coil covers and end rings to assure maximum separating ability. Write for CATALOG.

DINGS MAGNETIC SEPARATOR COMPANY
516 E. Smith St.,
Milwaukee 7, Wisconsin

Dings MAGNETIC SEPARATION HIGH INTENSITY

World's Largest Exclusive Builders of Magnetic Equipment . . . Est. 1899

PRICES

PIG IRON

All prices set in bold face type are maximum established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maximum. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston	*$25.50*	*$25.00*	*$26.50*	*$26.00*	.....	.....
Brooklyn	*27.50*	*27.00*	.....	*28.00*	.....	.....
Jersey City	*26.53*	*26.03*	*27.53*	*27.03*	.....	.....
Philadelphia (4)	*25.84*	*25.34*	*26.84*	*26.34*	*$30.74*	.....
Bethlehem	$25.00	$24.50	$26.00	$25.50	.....	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	$29.50	.....
Birdsboro, Pa. (3)	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpesville, Pa. (1)	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati, Ohio	*25.11*	*24.61*	.....	*25.11*	.....	.....
Canton, Ohio	*25.39*	*24.89*	*25.89*	*25.39*	*32.69*	.....
Mansfield, Ohio	*25.94*	*25.44*	*26.44*	*25.94*	*32.86*	.....
St. Louis	*24.50*	*24.50*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	*35.46*	..... *$37.34*
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	*32.42*	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown	24.00	23.50	24.50	24.00	*32.42*	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	34.00
Lyles, Tenn., fc. (2)	.....	.....	.....	.....	.....	33.00
St. Paul	*26.63*	26.13	*27.10*	*26.63*	*39.80*	.....
Duluth	24.50	24.00	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*26.95*	.....	.....	.....	.....	.....
San Francisco	*26.95*	.....	.....	.....	.....	.....
Seattle	*26.95*	.....	.....	.....	.....	.....
Provo, Utah	22.00	21.50	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON; Valley or Pittsburgh furnace $23.50

(1) Pittsburgh Coke & Iron Co. (Sharpesville, Pa., furnace only) and the Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable. Struthers Iron & Steel Co. may add another $1.00 per gross ton for iron from Struthers, Ohio, plant.

(2) Price shown is for low-phosphorus iron; high phosphorus sells for $28.50 at the furnace.

(3) E. & G. Brooke Co., Birdsboro, Pa., permitted to charge $1.00 per ton extra.

(4) Pittsburgh Ferromanganese Co. (Chester furnace only) may charge $2.25 a ton over maximum basing point prices.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and $1 per ton extra for each additional 0.25 per cent nickel.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

Copper, electrolytic, 150 and 200 mesh	21½ to 23½c.
Copper, reduced, 150 and 200 mesh	20½ to 25½c.
Iron, commercial, 100 and 200 mesh 96 + % Fe	13½ to 15c.
Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots	4c.
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots	63c.
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 33c.
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42c.
Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90c.
Aluminum, 100 and 200 mesh	*23 to 27c.
Antimony, 100 mesh	20.6c.
Cadmium, 100 mesh	$1
Chromium, 150 mesh	$1.03
Lead, 100, 200 & 300 mesh	11½ to 12½c.
Manganese, 150 mesh	51c.
Nickel, 150 mesh	51½c.
Solder powder, 100 mesh	8½c. plus metal
Tin, 100 mesh	58¾c.
Tungsten metal powder, 98%-99%, any quantity, per lb.	$2.60
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	$2.60
Under 100 lb.	$3.00

*Freight allowed east of Mississippi.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$7.00*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.25
Foundry, By-Product	
Chicago, del'd	13.35
Chicago, f.o.b.	12.60
New England, del'd	14.25
Kearny, N. J., f.o.b.	12.65
Philadelphia, del'd	12.88
Buffalo, del'd	13.00
Portsmouth, Ohio, f.o.b.	11.10
Painesville, Ohio, f.o.b.	11.75
Erie, del'd	12.75
Cleveland, del'd	12.80
Cincinnati, del'd	12.85
St. Louis, del'd	13.85
Birmingham, del'd	10.50

*Hand drawn ovens using trucked coal permitted to charge $7.75 per ton plus transportation charges.

HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

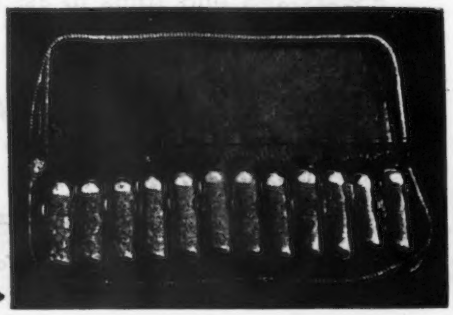
The unprecedented demand for our—

Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

Manchester, New Hampshire



HEAT-TREATED STEEL GRIT

PRICES

REFRACTORIES
(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	$64.00
First quality, Pa., Md., Ky., Mo., Ill.	51.30
First quality, New Jersey	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	46.55
Sec. quality, New Jersey	51.00
No. 1 Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania and Birmingham	$51.30
Chicago District	58.90
Silica cement, net ton (Eastern)	9.00

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick

Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.48
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

RAILS, TRACK SUPPLIES
(F.o.b. Mill)

Standard rails, heavier than 60 lb., No. 1 O.H., gross ton	*$40.00
Angle splice bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	*$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plate, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.

***Add $3.00 per gross ton to delivered price —OPA Interim Increase, Jan. 11, 1945.**

CORROSION AND HEAT-RESISTING STEEL
(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.10c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

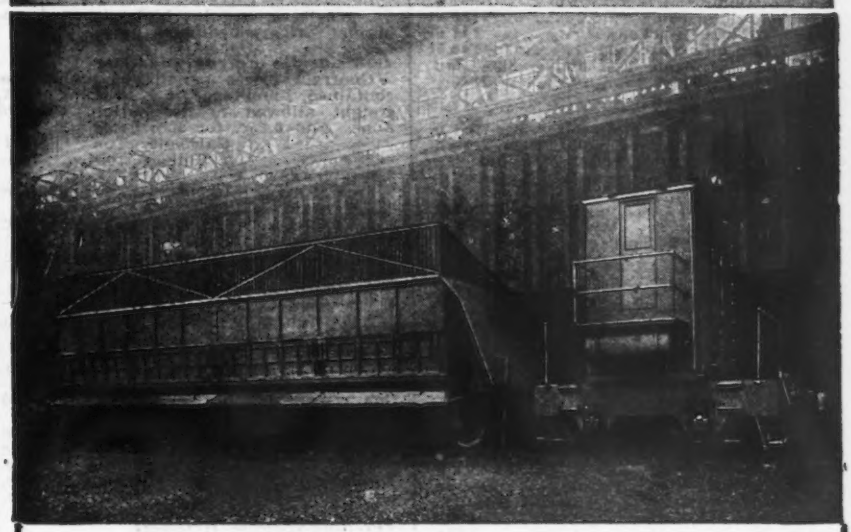
*Includes annealing and pickling.

ELECTRICAL SHEETS
(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

COKE OVEN EQUIPMENT



QUENCHING CARS AND LOCOMOTIVES

All Atlas Coke Oven Equipment is of heavy-duty construction permitting the peak operating conditions required in today's stepped-up production schedules. As a result of years of experience, Atlas is able to design and build equipment, to meet the requirements of each particular coke plant. Detailed information available on request.

Other ATLAS Products

Ore Transfer Cars
•
Scale Charging Cars
•
Electrically Operated Cars for Every Haulage Purpose

Locomotives for Switching and Interplant Haulage
•
Turntables

The ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1100 IVANHOE RD. CLEVELAND, OHIO, U. S. A.

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. cars at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Carload lots (packed)	141.00
Less ton lots (packed)	148.50

$1.70 for each 1% above 82% Mn penalty, $1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.	
Carload, bulk	36c
L.c.l. lots	38c
95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.	
Carload, bulk	34c
L.c.l. lots	35c

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50

Electric Ferrosilicon

OPA maximum base price cents per lb contained Si, lump size in carlots, f.o.b. shipping point with freight allowed.

	Eastern Zone	Central Zone	Western Zone
50% Si	6.65c.	7.10c.	7.25c
75% Si	8.05c.	8.20c.	8.75c
80-90% Si	8.90c.	9.05c.	9.65c
90-95% Si	11.05c.	11.20c.	11.65c

Spot sales add: 45c. per lb. for 50% Si, .3c. per lb. for 75% Si, .25c. per lb for 80-90% and 90-95% Si.

Silvery Iron

(C/L, Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio	$29.50*
Buffalo	30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorous or over.

*OPA price established 8-24-43.

Bessemer Ferrosilicon

Prices are $1 a ton above silvery iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination for l.c.l. above 2000 lb., packed. Add .25c for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe	13.10c.	13.55c.	16.50c
97% Si, 1% Fe	13.45c.	13.90c.	16.80c

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	3.35c.	3.50c.	3.65c.
2000 lb.-carload	3.8c.	4.2c.	4.25c.

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05c
2000 lb. to carload	6.70c
Under 2000 lb.	6.90c
Briquets, contract, basis carlots, bulk freight allowed, per lb.	5.80c
2000 lb. to carload	6.30c
Less ton lots	6.55c

Ferrochrome

(65-72% Cr, 2% max. Si)

OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% C	13.00c.	13.40c.	14.00c
0.10% C	12.50c.	12.90c.	13.50c
0.15% C	12.00c.	12.40c.	13.00c
0.20% C	11.50c.	11.90c.	12.50c
0.50% C	11.00c.	11.40c.	12.00c
1.00% C	10.50c.	10.90c.	11.50c
2.00% C	10.50c.	10.90c.	11.00c
66-71% Cr, 4-10% C	13.00c.	13.40c.	14.00c
62-66% Cr, 5-7% C	13.50c.	13.90c.	14.50c

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

Low-Carbon Ferromanganese

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

	Carloads, Bulk	Ton Lots	Less Ton
0.10% max. C, 1 or 2% max. Si	23.00c.	23.40c.	23.65c.
0.15% max. C, 1 or 2% max. Si	22.00c.	22.40c.	22.65c.
0.30% max. C, 1 or 2% max. Si	21.00c.	21.40c.	21.65c.
0.50% max. C, 1 or 2% max. Si	20.00c.	20.40c.	20.65c.
0.75% max. C, 7.00% max. Si	16.00c.	16.40c.	16.65c.

Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	8.25c.	8.55c.	8.95c.
Ton lots	8.75c.	9.25c.	10.75c.
Less ton lots	9.00c.	9.50c.	11.00c.

Ferromanganese Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	6.05c.	6.30c.	6.60c.
Ton lots	6.55c.	7.55c.	8.55c.
Less ton lots	6.80c.	7.80c.	8.80c.

Calcium—Manganese—Silicon

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carloads	15.50c.	16.00c.	18.05c.
Ton lots	16.50c.	17.35c.	19.10c.
Less ton lots	17.00c.	17.85c.	19.60c.

Calcium Metal

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

	Cast	Turnings	Distilled
Ton lots	$1.80	$2.30	$5.00
Less ton lots	2.30	2.80	5.75

Chromium—Copper

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 8c. for spot sales.

Shot or ingot	45c.

Ferroboron

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.60% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots	$1.20	$1.2075	$1.229
Less ton lots	1.30	1.3075	1.329

Manganese—Boron

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots	$1.89	$1.903	$1.925
Less ton lots	2.01	2.023	2.055

Nickel—Boron

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

	Eastern Zone	Central Zone	Western Zone
11,200 lb. or more	$1.90	$1.9125	$1.9445
Ton lots	2.00	2.0125	2.0445
Less ton lots	2.10	2.1125	2.1445

Other Ferroalloys

Ferrotungsten, Standard grade, lump or ¼X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more	$1.90
Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.	
Open hearth	$2.70
Crucible	$2.80
Primos	$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal	$1.50
Vanadium pentoxide, 88%-92% V_2O_5 technical grade, contract basis, any quantity, per lb. contained V_2O_5. Spot sales add 5c. per lb. contained V_2O_5	$1.10
Ferroboron, contract basis, 17.50% min., Bo, f.o.b. producer's plant with usual freight allowances, per lb. of alloy.	
2000 lb. to carload	$1.20
Under 2000 lb.	1.30
Silcaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)	
Carload lots	25c.
2000 lb. to carload	26c.
Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)	
Carload lots	58c.
2000 lb. to carload	59c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis	
No. 1	87.5c.
No. 6	60c.
No. 79	45c.
Bortram, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.	
2000 lb. lots	$2.25
Under 2000 lb. lots	$2.30
Ferrotitanium, 40%-45%, 0.10% C max. f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti	$1.23
Less ton lots	$1.28
Ferrotitanium, 20%-25%, 0.10% C max., ton lots, per lb. contained titanium	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload	$142.50
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.80
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo.	95c.
Calcium molybdate, 40%-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo.	80c.
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo.	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo	80c.
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add ½c. for spot sales	
Carload lots	14c.
Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy	
Carload, bulk	4.6c.
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk	5.75c.
Ton lots	7.25c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.	
Car lots	8.75c.
Ton lots	9.25c.

Rust Malleable Iron Foundry Is Completed For Lake City Firm

Ashtabula, Ohio

• • • What is believed to be the largest malleable iron foundry built in the past 17 years has been built for Lake City Malleable Co. at Ashtabula, by the Rust Engineering Co. The facilities are financed and owned by Defense Plant Corp.

The 3½ acre structure, which makes Lake City Malleable one of the largest operators in the country, was authorized to fill the need for malleable parts for tanks and trucks, both military and those being built for expanded domestic transport.

All glass sidewalls, air conditioning and dust collection systems assuring a degree of cleanliness unuual in foundry work, are notable plant features.

The production area is served by an electrically operated crane and monorail system with no lifting required by labor, allowing employment of skilled labor, grinders and molders, almost exclusively.

Operations are on the following straight flow basis:

1—Storage facilities for raw materials.

2—Duplex melting system of cupolas and air furnaces.

3—Molding and casting system embodying power conveyors.

4—Casting and sand handling facilities.

5—Electrically heated elevator type annealing furnace.

6—Cleaning and finishing equipment.

7—Shipping facilities.

This production line is plotted on the basis of carefully estimated data of storage of supplies, labor, and equipment capacity, to maintain a continuous flow of castings.

Rust designed and constructed the plant and erected its equipment. In addition to supplying vital products for war purposes, the postwar future of the foundry is expected to be important since a large part of malleable output normally goes to the automobile industry.

New Contract Written For Amphibious Tanks

San Jose, Calif.

• • • Two new contracts totaling $32,677,950 for production of "Water Buffalo" amphibious tanks have been signed by the Navy Department and Food Machinery Corporation.

These contracts extend the "Water Buffalo" program through September, 1945, at the present rate of production in plants at San Jose and Riverside, California, and Lakeland, Fla. They bring the corporation's backlog of unfilled orders to more than $207,000,000.

Optimum Plate Width

(CONTINUED FROM PAGE 59)

increase in production.

Where welded joints in vessels have to be inspected in the field after certain periods of operation, wide plates, by reducing the number of seams, keep such service costs at a minimum.

The allowable overweight of steel plates has sometimes been considered as an objection to the use of wide plates. As the width of the plate increases up to 168 in. the allowance for overweight likewise increases. From 168 to 195 in. the percentage overweight allowance remains constant.

The cost of wide plates is increased by this overweight, but this increase is a small fraction of the savings in fabricating costs and manhours resulting from the use of wide plates. The following example illustrates this point in a vessel that could be built either of two plates 240 x 144 x ½ in. or of three plates 240 x 96 x ½ in. The increased overweight allowance for the two 144 in. plates is $20.54, including the base price, quality extra and width extra involved as a result of this overweight. This overweight cost plus the width extra cost for the two 144 in. plates over that of the two 96 in. wide plates is $118.48. The extra fabricating cost plus overweight for the three course construction is $178.78. The 144 in. plates, despite the greater overweight allowance, show a net saving of $60.30 per vessel.

The preceding considerations determining optimum plate widths apply equally to plates of low-alloy steel. The width extras for such steels are somewhat higher in proportion to their fabricating costs; the maximum economic width is found to be approximately 10 per cent lower than the carbon steels.

The use of wide plates of clad steels shows even greater savings than with the carbon steels, as both the base price of the material and the fabricating costs are higher in proportion steels. The fabricating costs are increased by the car necessary in working the clad materials, and by the cost of the accessory metals such as welding electrodes. With clad steels, the widest possible plate should always be used; all known examples show savings. The high priced solid stainless and non-ferrous metals show similar saving for wide plates.

Metal Can Shipments in Tons of Steel

Aug.-Sept. and 10 Months Total 1944

Source WPB Container Division

All-Metal Cans as Designed for Packing	August	September	October*	Ten Months Total
Fruits and Vegetables	149,241	138,410	83,077	793,921
Condensed and Evaporated Milk	28,727	25,703	22,884	273,171
Other Dairy and Poultry Products	3,234	2,343	2,522	30,795
Meat	10,489	10,749	10,280	112,299
Fish and Sea Food	10,925	9,774	12,900	84,730
Military Rations	10,529	9,942	10,942	74,446
Beer	4,658	4,431	4,995	29,768
All Other Foods	31,948	30,098	22,235	217,381
All Non-Foods	17,646	14,923	19,899	163,189
Total	267,397	246,373	189,734	1,779,700

* Preliminary.

1945 Climaxes

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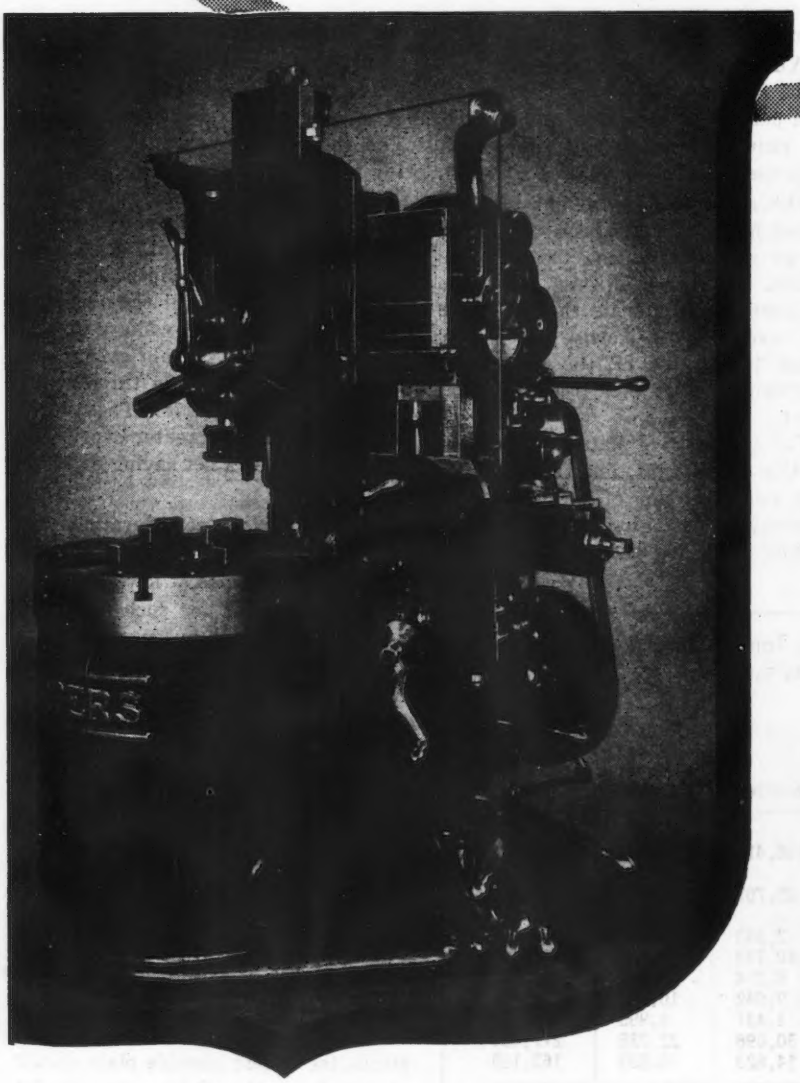

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